

# The pragmatics, embodiment, and efficacy of lived experience: Assessing the core tenets of Varela's neurophenomenology

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## Abstract

Varela's enactive approach to cognitive science has been elaborated into a theoretical framework of agency, sense-making, and sociality, while his key methodological innovation – neurophenomenology (NP) – continues to inspire empirical work. We argue that the enactive approach was originally expressed in NP as three core tenets: (1) phenomenological pragmatics, (2) embodied cognition, and (3) conscious efficacy. However, most efforts in NP have focused on applying tenet 1, while tenet 2 has received notably less attention, and there is even explicit distancing from tenet 3. By way of a critical review of four case studies, we show how NP thereby falls short of its full potential. Crucially, it needs to demonstrate that the first-person perspective matters, not only as a source of correlations with third-person data, but because lived experience, as such, makes a difference in its own right to the living body's dynamics. Given that methods for improving subjective reports have become accepted in human neuroscience (tenet 1), and given the increasing availability for recording multi-scalar organismic activity during embodied action (tenet 2), we propose it is time to integrate these research strands by using this issue of conscious efficacy as a pivot point (tenet 3). The development of genuinely *experience-involving* accounts of neurophysiological activity during embodied action holds promise for rebooting neurophenomenology in stronger form.

## 1. Introduction – The many faces of Varela

One of the most prominent bass notes running through Varela's whole career is his grappling with the tension of correctly characterizing the relationship between our mind and body. And from the beginning he refused to be confined to exploring this tension solely from within the Western tradition of the mind-body problem. Instead, he is more impressed by pragmatic and even contemplative approaches to investigating body and mind, especially as found in certain strands of Buddhism. The title of Varela's (1976) early essay dedicated to the relationship between body and mind is an implicit reference to Zen Buddhist Suzuki's famous formulation of this relationship as "not two, and not one". Suzuki's book starts with a reflection on zazen sitting posture:

This is the most important teaching: not two, and not one. Our body and mind are not two, and not one. If you think your body and mind are two, that is wrong; if you think that they are one, that is also wrong. Our body and mind are both two *and* one. (Suzuki, [1970] 2020, p. 7)

This characteristically paradoxical Zen Buddhist perspective strategically sidesteps the two main contenders of Western metaphysics, namely monism and dualism. In an unpublished and undated manuscript fragment titled “The Obvious”<sup>1</sup>, which Varela likely wrote around the same time, we find an explicit reference to Suzuki. There, Varela explores the possibility that the state of mindfulness resulting from zazen practice can counter an evolutionarily ancient, intrinsic tendency of brain activity, namely its tendency of habituation. The two-page fragment concludes as follows:

The greatest contribution of contemporary continental philosophy is, I believe, to note this obvious state of affairs. Namely, the obvious. That human life finds itself amongst already a given world, a familiar environment in which and from which it has always been living. Being human is to have such a background of familiarity. This is conveniently called tradition. Tradition is our habituation to become older, to grow. In the midst of it we walk and live. We note it when it changes, we don't see what we don't see.

Now to the obvious about sitting practice. Suzuki Roshi says (...). In fact, mindfulness is mindfulness of the familiar, of that which is hidden which we want to forget. It is an unnatural act, contrary to the habituating nervous system. It is, precisely, a reminder. A constant waking up. Waking up from the unfamiliar to the familiar, to discover that it is there like the space surrounds a house in which we sleep. (Varela, *The Obvious*)

Yet it is also telling that this fragment remained unpublished, and that the inspiration from Zen Buddhism remained implicit in the published essay (Varela, 1976) in favor of explicit references to post-Hegelian Western philosophy (Merleau-Ponty's name is briefly dropped, consistent with the appeal to continental philosophy in *The Obvious*). Whether by strategic choice or because of external resistance, the more radical ideas and influences leading to the controversial claim that conscious activity can have efficacy over brain activity did not come out in publication at this time. It has never been easy to break old habits of academia, and as the heady '70s came to a close while Varela's career in neuroscience was on the rise, it is understandable why these ideas and inspirations took a backseat until the time was ripe for their re-emergence, this time in more fully developed form – articulated both in Buddhist and phenomenological terms – in *The Embodied Mind* (Varela et al., 1991).

It is interesting that the fragment gives a much more candid picture of Varela's thinking than what we find in the published essay, which was originally presented in front of an audience -

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<sup>1</sup> Many thanks to Amy Cohen-Varela for the helpful discussions and for sharing this manuscript fragment. It was produced quickly on a typewriter, and its many typos are corrected in the quotations included here.

the “Mind-Body Conference”, which also involved second-order cyberneticists like Bateson and von Foerster (Thompson, 2004).

It is noteworthy that, in contrast to Varela’s unpublished reflections on the phenomenological insight that we always already find ourselves living in the world before we begin to entertain reflections about that world, these two influential cybernetics scholars had just published directly opposite claims. For example, von Foerster (1973, p. 211) had posited that “the environment as we perceive it is our invention”, while Bateson (1971, p. 443) had claimed that “we now know, with considerable certainty, that the ancient problem of whether the mind is immanent or transcendent can be answered in favor of immanence”. This replacement of one extreme position about reality (e.g. internalist representationalism) by another extreme position (e.g. radical constructivism) seems to be an oversimplified move from today’s enactive perspective. From the perspective of contemporary enactivism, with its explicit emphasis on developing a world-involving account of the mind, it would be a misstep to replace the classic cognitivist idea that minds ‘contain’ external reality in the format of internal representations with an equally problematic radical constructivism (i.e., that human beings invent or project reality in its entirety according to their own psychobiological apparatus).<sup>2</sup> It is therefore fascinating that this unpublished fragment reveals just how early Varela had realized that phenomenology offers a third way, namely, to reject their shared premise of internalism altogether in favor of starting point situated in the shared lifeworld (Froese, 2011).

Throughout the text of Varela’s (1976) published essay, it is like we can hear him speaking to his influential cybernetics audience, and he knew how to work the crowd. What this indicates is that his published writings are perhaps best interpreted in terms of what he might have called conversational patterns, that is, they are his means of engaging with a specific audience. And more than is perhaps usual in science, we therefore need to take the stance of his audience into account when trying to work out Varela’s own thinking on matters of key importance – for example, because of the unpublished fragment we know that he publicly downplayed his agreement with continental phenomenologists and Zen Buddhists about the primacy of the world-involving basis of experience while presenting his ideas to his second-order cybernetics colleagues. It is as if he adopted a Wittgensteinian approach to philosophy as therapy – given that it would make little sense to confront his audience by dropping internalism in favor of a world-involving account of experience, he instead gives a talk that emphasizes the need for experiential transformation to make progress.

As he puts it in an early interview with Joan Halifax<sup>3</sup>, while on the academic conference circuit he feels himself performing somewhat like a bard in the Middle Ages: he gets invited to sing his songs in front of an audience, is hosted for a while, before he must move on again to the next location. In other words, there is some scholarly work still to be done to extract the

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<sup>2</sup> To be fair, not all proponents of enactivism agree with our assessment. There is a lively debate between those who are rejecting any explanatory role of observer-independent reality and those making room for relational world-involving explanations (e.g., Valenzuela-Moguillansky et al. 2021; Vörös et al. 2016; Bitbol and Antonova 2016). We note that this kind of debate has deep roots: radical constructivism has parallels with 19th-century psychologism, which, according to Husserl, phenomenology itself was supposed to overcome.

<sup>3</sup> This interview is included as part of Franz Reichle’s documentary *Mind and Life – Early Dialogues*.

underlying bass notes from Varela's diverse repertoire of audience-involving songs. This is especially the case given that much of his academic work, like the methodology introduced as neurophenomenology (NP), was and still remains challenging for traditionally-oriented cognitive science (Bockelman et al., 2013).

As a contribution to this endeavor, we propose that there are three bass notes that are crucial for understanding Varela's oeuvre. They can first be tentatively heard in these early writings, but finally come out in full volume in *The Embodied Mind*, and especially with his inauguration of the NP research program. We posit that the three core tenets of NP are:

1. *Pragmatics*: Lived experience must be practically investigated with domain-relevant tools and with equivalent systematic rigor as is brain activity.
2. *Embodiment*: Brain activity must be properly contextualized as embodied in a living organism in constant interaction with the world.
3. *Efficacy*: The lived experience of an agent's sense-making must be granted to have an impact on brain-body activity in its own right.

Each of the three tenets can be considered as challenging to cognitive science. Hence the NP research program, which aims to integrate all three into one coherent methodology, is exceptionally challenging. Still, since its inauguration in the 90s, the use of first- and second-person methods (tenet 1) has developed (Froese et al. 2011), and they have slowly become integrated into the methodological toolbox of cognitive neuroscience, especially in the field of contemplative neuroscience. And there has also been growing consideration of the role of the living body by mainstream cognitive science (tenet 2), for example in the contexts of interoception, arousal, and even the gut-brain axis. In comparison, the causal efficacy of conscious experience (tenet 3) is still not a widely studied topic, apart from the neuroscience of free will, but where it usually is approached in the context of reductive physicalism. In contrast, NP is explicitly defined as a non-reductive approach to the study of the "causal efficacy of consciousness— that aspect of consciousness in virtue of which we human beings (and other animals) qualify as conscious agents" (Varela and Thompson, 2003). Moreover, this definition reveals that all three tenets hang together: it is through our own first-person perspective (tenet 1) that we experience the role of the living body (tenet 2) in realizing conscious intentions (tenet 3). Accordingly, the NP research program is, as Gallagher and colleagues (2015) put it, the "real hard" science:

NP resists the third-person objectification of what is rightly first-person subjective, and it values the unique source of data provided by an experiencer. Thus, scientists should not simply eliminate subjective experience and first-person accounts because they do not fit neatly into the rigid practices of most "hard science" (Bockelman et al., 2013). The real "hard" science, the difficult science, is the science that attempts to find ways to integrate first-person data with third-person data and to account for both neural and extra-neural factors. (Gallagher et al., 2015, p. 67)

While themes of embodiment were comparatively less salient in Varela (1996) compared to his other works, he clearly considers it a core part of the NP enterprise:

I cannot elaborate here the current state of embodied cognitive science, but my present proposal concerning the study of consciousness aligns itself with those larger concerns. It seems inescapable to take the trend towards embodiment one step further in the direction of a principled consideration of embodiment as lived experience. (Varela 1996, p. 346)

Pre-phenomenological cognitive neuroscience, on Varela's account, repeatedly generated problems that treated consciousness as epiphenomenal, putting science in direct tension with what we label here as tenet 3: 'efficacy'.<sup>4</sup> In Varela's words:

These developments, at the same time, created the very background for the hard problem, since they made consciousness appear as devoid of any causal relevance. This is well illustrated in Ray Jackendoff's pioneering book, in which the phenomenological mind (i.e. consciousness qua experience) is seen as projection from a computational mind (i.e. cognitive mechanisms) where all causality takes place. Thus the only conclusion he can come to is that consciousness is not good for anything (1987, p. 26). (Varela 1996, p. 331)

On this view, the ideal NP study would be capable of speaking to all three tenets. However, no NP studies have, as of yet, successfully managed to incorporate all three tenets into a single experimental paradigm. There are exceptions, but it is striking that for much of NP's history there has been little concern to go beyond the "neuro-centrism" of cognitive neuroscience, i.e., by systematically taking into account the brain's embodiment and situatedness in the world (Beaton, 2013). And there has been even less appetite for returning to the hard problem of consciousness (Chalmers, 1995), i.e., by working out how to make the necessary conceptual space such that lived experience can play a role in embodied action in terms of what we will call an *experience-involving* account.

Perhaps some of this reluctance is informed by Varela's formulation of NP as a methodological remedy, not a "theoretical fix". NP was supposed to dissolve the very framing of the 'hard problem of consciousness' by effecting a phenomenological reorientation and by developing descriptions of lived experience that could match the descriptive precision of neural activity by cognitive neuroscience. Again, we need to keep in mind the audience of this conversational pattern, which helps to explain why NP initially had a more brain-centered and pragmatic focus. Still, there is an internal coherence to Varela's broader efforts in the '90s. It is insightful to recall that he launched the NP program alongside an article presenting his core hypothesis on the emergence of mental-cognitive states into primary consciousness:

**Core Hypothesis:** Mental-cognitive states are interpretations of current neural activity, carried out in reference to a transient coherency-generating process generated by that nervous system. (Varela, 1995, pp. 90-91)

In light of this core hypothesis, the main strands of Varela's efforts in the '90s fall into place:

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<sup>4</sup> Here, we take conscious efficacy to pertain to the 'hard problem' and 'explanatory gap' discussed in the science of consciousness, although efficacy is a broader problem that includes all kinds of motivated activity (Froese and Karelín 2023). For an account of how these similar problems diverge, see Lutz and Thompson (2003).

- i. *The NP research program* is needed to systematically work out what is happening on the side of primary consciousness by bringing in disciplined first-person methods (Varela, 1996);
- ii. *The enactive approach* is needed to ensure that the core hypothesis is not framed in terms of an internalist brain-identity thesis, but that brain activity is contextualized as part of cycles of organismic embodiment at various levels of description (Thompson and Varela, 2001, Varela et al., 1991); and
- iii. *Autopoietic theory* is needed to develop an account of how an organism is capable of taking up such an “interpretative” stance or concerned perspective that brings out the significance of its own dynamics (Varela, 1997).

The rich links between these three different strands of Varela’s research have already been articulated by others (Thompson, 2004, e.g., Rudrauf et al., 2003, Thompson, 2007). What is implicit in all three strands, but is absent as a dedicated strand of research, is the question of conscious efficacy. Indeed, an assessment of the status of the NP program by some of Varela’s closest colleagues, following nearly a decade of research, came to a rather modest conclusion regarding its originally stated ambition to rework the mind-body problem:

At a more abstract conceptual level, neurophenomenology aims not to *close* the explanatory gap (in the sense of conceptual or ontological reduction), but rather to *bridge* the gap by establishing dynamic reciprocal constraints between subjective experience and neurobiology. At the present time, neurophenomenology does not claim to have constructed such bridges, but only to have proposed a clear scientific research program for making progress on that task. (Thompson et al., 2005, p. 89)

An important insight of this assessment is that it highlights what would in principle count as a successful answer to the mind-body problem. NP shifts the criterion of success away from the impossible ideal of closing the gap between the domains of mind and matter, which would require an *elimination* of their distinctive differences, toward a possible bridging of the gap that depends on *respecting* their differences. This shift is crucial because it highlights that such a non-reductionist approach, while initially appearing to give up on closing the gap, may ultimately be scientifically more feasible: for as long as workable bridges can be constructed over the gap between body and mind in the first place, it is less of a worry that parts of the gap below the bridge remain obscure. This unavoidable obscurity may even turn out to be an essential part of what it means to respect mind and body’s distinctive differences, potentially requiring us to explicitly work with the resulting uncertainty (Froese 2023).

However, the sobering conclusion at that stage was that, even by shifting the explanatory goal posts, for NP the mind-body problem remains a considerable challenge. The situation was not different a decade later, with Gallagher and colleagues (2015) explicitly separating their substantial contributions to the NP research program from the mind-body problem. Another way of putting this is that, in spite of Varela’s insistence on the importance of lived experience for cognitive science, the various research strands which he launched have not become integrated into a scientific theory of consciousness with the kind of systematicity and level of

detail that is nowadays expected of such theories (e.g., Seth and Bayne, 2022).<sup>5</sup> We may wonder why a research program that has for over a couple of decades dedicated itself to “neurophenomenology” has not given rise to a more productive science of consciousness. Is the revolutionary ambition of NP perhaps misguided after all? Or, alternatively, has it not yet been given enough of a shot on its own terms to see where it may still take us?

With this in mind, in what follows, we will examine both classic and recent examples of NP with an eye as to which lessons can be gained moving forward. The aim is to uncover clues to help us to revisit the theoretical foundations of this research program to examine how it can continue to develop in-line with Varela’s initial aspirations. In what follows, we examine several recent paradigmatic studies and then briefly discuss 1: How experimental NP can expand its horizons 2: How, conversely, NP can help current consciousness research by highlighting the need to develop an experience-involving account of efficacy.

## 2. Neurophenomenology (NP): Four case studies

In this section, we provide a brief overview of four illustrative papers in NP, including a pioneering study, alongside two studies and a review that were published within the last five years. We acknowledge that there is a large amount of literature that is relevant to NP even when it does not identify with NP explicitly. However, here our focus is on neuroscientific studies that explicitly refer to the tradition of NP as formulated by Varela. Our emphasis will be on assessing to what extent these studies reflect Varela’s three tenets of NP that we identified in the introduction. Furthermore, we note that what unites these studies is that each focuses upon a relatively abnormal or non-ordinary state of consciousness (NSC): 1. Epileptic seizure, 2. Near-death experience, 3. Schizophrenia, and 4. Psychedelic drug-use.

### 2.1 Case 1: Preictal experience (PIE) – the ‘Paris Group’

A paradigmatic and pioneering exemplar of the neurophenomenological approach can be found in a series of studies conducted by Varela and colleagues throughout the late ‘90s and early ‘00s, sometimes termed the ‘Paris Group’ (Navarro et al., 2005, Petitmengin et al., 2006, Petitmengin, 2009, Le Van Quyen et al., 2001). These studies employ what may be called an ‘operationalized *epoché*’ (Sykes, 2021), inspired by Husserl’s phenomenology and redeployed as a qualitative measure to obtain more reliable first-person data (Varela and Shear, 1999), particularly in its dynamic and pre-reflective format (Petitmengin et al., 2007) by ‘bracketing’ (*epoché*) superfluous dimensions of an experience. This technique later came to be known as the ‘micro-phenomenological review’ (Petitmengin 2017).

One of the earliest applications of the micro-phenomenological interview was to epilepsy (Le Van Quyen et al. 2001; 2005; Petitmengin 2006); more specifically, the researchers correlated experiential and neurophysiological profile occurrent immediately before a seizure’s onset

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<sup>5</sup> However, it may be worth noting that many phenomenologists explicitly formulate the phenomenological research program as a descriptive methodology, and not as a theory of consciousness as such. For example, Heidegger largely eschewed talk of ‘consciousness’ altogether, likely because he believed the dominant formulation of the term indebted to a Cartesian paradigm. See also Bitbol and Antonova (2016).

(*ictus*). This ‘preictal stage’ (before seizure onset) features a specific neural signature characterized by desynchronization of the neural populations surrounding the epileptic focus, which had previously been assumed to begin five minutes prior to seizure. They aimed to discover whether the preictal stage was characterized by a phenomenological profile that matched the neurophysiological profile of the preictal stage of the seizure. Accordingly, the operationalized *epoché* was applied to patients recalling preictal experiences (PIEs). Unexpectedly, PIEs were found to begin hours before seizure onset. Subsequent reanalysis of the intracranial EEG data, guided by this first-person data, found the neural signature of the preictal stage (decreased neural synchronization) in fact also begins around five hours prior to the seizure (Petitmengin, 2009, Petitmengin et al., 2006). Thus, a more extended correlation between changes in first-person experience and in neural activity was first uncovered by combining neuroimaging (third-person quantitative) and phenomenological (first-person qualitative) measures. This is a key proof of concept.

The qualitative data’s validity, and thus its clinical application, was dependent on the rigor of the micro-phenomenological interview. And the studies were driven by a clinical motivation, since enabling patients to take protective measures before seizure onset can minimize the risk of serious injury (Petitmengin, 2009). Moreover, as noted by Varela and Thompson (2003), previous studies have found evidence suggesting that engaging in a mental task can prevent seizure onset. However, precisely *how* the first-person perspective was supposed to be able to make a difference to brain activity was not made explicit. Indeed, the goal of these studies was not to provide an account of the relationship between the traditional categories of mind and matter, but to further the pragmatic goal of ascertaining medical applications.

In summary, the epilepsy studies clearly addressed the first tenet of NP, *pragmatics*, but they were (understandably) less concerned with relating it the second (*embodiment*) and third (*efficacy*) tenets. The focus remained squarely on brain dynamics without much consideration for roles of the rest of the body nor its interaction with the environment. The studies did not elucidate how any change in personal-level lived experience *as such* could make a difference to the sub-personal neural processes. In other words, while the guiding intuition is akin to that found in Varela’s unpublished fragment, where he considers how *zazen* overrides intrinsic tendencies of brain activity, we are left without any explanatory mechanism of how this could be so. It seems that the assumed interaction or interdependence between lived experience and brain activity goes beyond what is allowed in the framework of supervenience theory or mind-brain identity theory, but the details are not spelled out.

## 2.2 Case 2: Near-Death Experience (NDE) – Martial et al. (2019)

Martial et al. (2019) chose to use a NP approach whereby both first-person phenomenological data and third-person neurophysiological data are linked and then analyzed in a “mutual constraint” relationship. Furthermore, since people vary in their ability to generate and report first-person experience, they employed techniques that helped subjects to become aware of previously unavailable or inaccessible aspects of their experience. They claim that thanks to this approach, they obtained phenomenologically enriched neurophysiological findings.

Like the epilepsy studies, this study takes aim at another relatively uncommon experiential category: near-death experiences (NDEs). Martial and colleagues begin with the premise that the neurobiological bases of NDEs remain largely mysterious. A major obstacle to reducing this mystery is the difficulty in circumscribing neural activity corresponding to the NDE itself from confounds. In service of this goal, they tested a small sample size ( $n=5$ ) of subjects who had experienced a positively valenced NDE. Participants were instructed to reexperience both their NDE and another positively valenced experience both during normal consciousness and whilst undergoing hypnosis. High-density EEG was recorded throughout the interview to confirm the measurable, objective 'reality' of the NDE experiences as a valid category, as disclosed by a phenomenological measure.

They found that NDE-related phenomenology correlated with increased alpha activity in frontal and posterior regions, which was interpreted as a proof-of-concept for experimentally studying NDEs and disentangling their neural signature. As the authors suggest, the positive valence of NDE experiences may prove useful in clinical and therapeutic contexts. Accordingly, as with the epilepsy studies, the confirmation via neuroimaging that recalled NDE experiences are measurably distinct from other forms of cognition has practical merit.

However, in both this study and the epilepsy studies, the phenomenological purist may take issue with the fact that the phenomenological data was taken from *memories* of the phenomena in question (i.e., PIEs and NDEs). Nonetheless, as the authors of both studies state, the kind of lived experience under investigation precludes ecological, world-involving investigation: experimenters cannot induce seizures or near-death situations in laboratory settings for purposes of cognitive science. Accordingly, these two NP studies exemplify the claim that neurophysiology can benefit from taking tenet 1 of NP seriously. However, they largely sidestep a fuller engagement with tenets 2 and 3, and understandably so, given the non-ordinary state of experience being investigated.

### 2.3 Case 3: Anomalous Self-Experience (ASE) – Nelson et al. (2020)

Nelson and colleagues (2020) adopted a different strategy of cross-disciplinary integration in their investigation of anomalous self-experience (ASE). They employed what they label a testable neurophenomenological *model* of schizophrenia spectrum disorders (SSD). A wide variety of measures were employed in this experiment – EEG, neurocognitive measures, and clinical measures such as Examination of Anomalous Self-Experience (EASE). However, in contrast to the previous two NP cases, phenomenological methodology was not injected in the format of the micro-phenomenological interview. Instead, the authors utilized conceptual resources already provided by clinical phenomenology, particularly those pertaining to the minimal self (Maj, 2012, Nelson et al., 2014). The phenomenologically-informed theoretical model was then tested with traditional methods employed in clinical neuroscience, with the authors claiming that the neural correlates of such disturbances had remained unclear.

More specifically, by drawing upon prior “theoretical neurophenomenological models that proposed that source monitoring deficits and aberrant salience”, the authors speculated there may be “neurocognitive/neurobiological processes that correlate with minimal self-

disturbance on the phenomenological level” (p. 2). Clinical phenomenology thus provided and refined the theoretical notion of the minimal self and posited its disruption in SSDs, while Nelson and colleagues aimed to expand the literature by empirically testing how these notions interface with related clinical notions and measurable neural signatures. Specifically, they investigated Healthy Control, Ultra-High-risk (UHR) and first episode of psychosis (FEP) populations and expected to find an “increasing gradient of severity from HC to UHR to FEP individuals (HC < UHR < FEP)” (p. 4), which they note was partially supported in the final analysis. The authors also found relationships between the constructs of ‘aberrant salience’ and ‘general psychopathology’ as well as between ‘source monitoring deficits’ and ‘disturbed self-experience’. However, contrary to expectations, no relationship was found between ‘aberrant salience’ and ‘disturbed self-experience’, with the authors noting that aberrant salience may in fact be more involved with disturbed *world* experience.

Underpinning this study is the important insight that a NP-informed model provides a more comprehensive description of symptomatology than standard models: “the data presented here and in other related recent research shows an emerging picture of neuro-features of core phenomenological aspects of schizophrenia spectrum disorders *beyond surface-level frank psychotic symptoms*” (p. 14; emphasis added). This supports Varela’s driving sentiment that folk-psychological and/or unrefined experiential categories are sub-optimal as targets for neuroscientific research, and that obtaining phenomenologically refined descriptions may lead to the discovery of new neural correlates. Yet again, despite reference to disruption in holistic world-experience, there was limited concern for tenets 2 and 3 of NP.

#### 2.4 Case 4: Non-ordinary States of Consciousness (NSC) – Timmermann et. al (2019; 2023)

Timmermans and colleagues (2019) present an NP study of the psychedelic experience, which is usefully set into a broader context of NP research in a later review paper (Timmermann et al. 2023). They emphasize that NP is uniquely positioned to investigate so-called ‘non-ordinary states of consciousness’ (NSCs). NSCs can include a wide range of experiences induced by hypnosis, meditation and/or psychedelic use. Timmermann and colleagues provide an overview of extant NP studies on NSCs and propose to unify them in a coherent conceptual framework. Studies cited in the paper include research on space, time, and body experiences in mindfulness meditators (Berkovich-Ohana et al., 2013, DorZiderman et al., 2016); visual imagery and sense of agency while under hypnosis (Cardeña et al., 2013); and their own study of altered experiences caused by the psychedelic drug DMT (Timmermann et al., 2019). As well as employing phenomenological interview methods, the studies correlated their findings with the neuroimaging methods MEG and EEG.

Justifying a NP approach to NSCs, Timmermann and colleagues cite the unreliability of naïve first-person reports. Additionally, the reciprocal importance of NSCs to the wider field of the cognitive sciences is found in their relevance for mental and physical health, in addition to the fact that NSCs can aide research by way of increasing or decreasing the salience or intensity of psychological phenomena in experimental settings. As such, the authors advocate for a kind of ‘breakdown’ logic (present in Heidegger’s phenomenology and popularized by

Dreyfus) to be operative in the investigation of consciousness by examining its perturbations in NSCs, whereby an alteration in a phenomenological structure renders its regular structure more transparent (see also, Shanon, 2003). Thus, NP and the study of NSCs are posited as mutually informing.

In their review, we are offered examples as to how not only tenet 1 can be deployed, but also 2 and 3. For instance, in connection with tenet 3, Timmermann and colleagues cite evidence that meditation can produce an observable effect on neurobehavioral experiments, which resonates with Varela's unpublished reflections from the 70s. For example, they refer to findings that habitual meditators display greater predictive validity during the Libet paradigm (Jo et al., 2014, Jo et al., 2015), which is an important experimental paradigm for discussions of the causal efficacy of consciousness. They note:

Compared to non-meditators, meditators seemed to be aware of subjective concomitants of negative deflections of the slow cortical potentials that precede actions (i.e., button presses), which could reflect the crucial feature of being able to initiate the usually unconscious processes of a voluntary movement with awareness. (Timmermann et al. 2023, p. 144)

In line with Gallagher and colleagues (2015), Timmermann and colleagues also give more weight to the tenet of embodiment:

Broadening this idea, the embedded nature of NSCs requires that methodologies for their study explicitly recognise and mobilise context and culture-specific settings (i.e., disciplined forms of know-how) in contemporary scientific settings... Consequently, an NP approach to NSC involves characterizing the interplay between brain, body, and environment at multiple spatial and temporal scales, and thus provides an opportunity to approach the study of consciousness beyond identifying mere brain-bound correlates. (Timmermann et al. 2023, p. 12)

Looking ahead, Timmermann and colleagues propose that the influence conferred by the situational context modulates hypnotic suggestibility and shapes the psychedelic experience, which "can allow the investigation of the plastic and dynamic nature of experience from a multiscale perspective that includes mind, brain, body, and context". Even these atypical experiences, then, can be explored as world-involving.

### **3. Discussion**

In each of these case studies, phenomenological resources were operationalized either in the format of a data collection method or as a theoretical model. Do these studies continue to pursue Varela's goal of incorporating first-person phenomenology into neuroscience? And can the resulting methodology still be labelled 'phenomenological'?<sup>6</sup> We tentatively argue yes

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<sup>6</sup> Here we refer to classical phenomenology as pioneered by figures such as Husserl and Heidegger. But as early as the 1920s, figures such as Minkowski and Binswagner were applying phenomenology to psychopathology and

on both counts. NP contains something of the structure of investigation developed by Husserl, namely that naïve descriptions of experience should be supplanted by methodologically rigorous descriptions of experience (Depraz, 1999, Petitmengin, 2006). Contemporary NP thus remains archetypally phenomenological insofar as it rejects descriptions of experience found in ordinary language in favor of those that are phenomenologically informed. Furthermore, phenomenological measures are able to catalogue pre-reflective experiences that other first-person measures often miss (e.g. questionnaires), insofar as they focus on reflective thoughts, beliefs, or judgements of experimental subjects (Petitmengin, 2007).

The novel claim of *neurophenomenology* is that these refined descriptions of lived experience correspond to measurable neural correlates that would otherwise remain inaccessible to experimental investigation. The NP studies cited above appear to empirically support this claim. From the perspective of mainstream neuroscience, then, phenomenology is at least a valuable method for disclosing replicable experiential categories that correspond with replicable neurophysiological signatures (Petitmengin, 2017). Methodologically, the degree of phenomenological involvement can also be located on a “thick-to-thin continuum” depending on the research topic (Berkovich-Ohana et al., 2020).

One experiential category is particularly striking in the literature: as Timmermann and colleagues (2023) highlight, NP has found repeated success by studying various NSCs (e.g., epileptic seizures, psychiatric disorders, near-death experiences, hypnotic, psychedelic or meditative states, awe, etc.). One reason for this focus may be that the epistemological benefits otherwise conferred by ‘bracketing’ are already partially present at the outset: NSCs are less bogged down by superfluous or confused descriptive categories that could impede their scientific investigation, while also requiring some phenomenological method to capture them accurately. From the empirical side also, NP may help to mitigate disadvantages that result from practical limitations regarding obtaining a large sample size: given that it is difficult to remove variability by averaging, the variability could instead be captured by a more fine-grained analysis of first-person experiences (Lutz et al., 2002).

By contrast, paradigmatic examples of phenomenological inquiry (e.g., Husserl, Heidegger, Scheler, Merleau-Ponty) have tended towards more general, fundamental phenomenological domains such as perception, temporality, or embodiment *as such*. And some of the earliest examples of NP conducted by Varela and his close collaborators have also investigated themes of temporality (Varela 1999) and visual perception (Lutz and Thompson 2003). However, their recent work has focused on how to make specifically non-ordinary states more accessible for empirical investigation, for example by training the minds of the participants (Lutz et al., 2015) and by creating immersive environments (Gallagher et al., 2015). Why there is currently an almost exclusive focus on NSCs in much of NP remains open for speculation, but it does make it harder to compare the results of NP with those of more traditional approaches to cognitive neuroscience. It may therefore be productive to backtrack to the trail set by Lutz and Thompson (2003) and focus on a broad phenomenal category (i.e., visual anticipation) while also introducing the body more explicitly into the experimental design.

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Merleau-Ponty incorporated clinical case studies into his phenomenology. We thank reviewer 1 for pressing us on this point.

Indeed, although contemporary instantiations of NP remain consistent with Varela's program, it is worthwhile to assess whether they hold up to all his aspirations. The case studies analyzed here rely primarily on what we identified as tenet 1 – pragmatics. Thus, NP contributes to the search for neural correlates of consciousness, while abiding by the standards of mainstream neuroscience, and more generally largely remaining metaphysically neutral (Pace Giannotta, 2021; but see Bitbol and Antonova 2016). As such, it is not clear how a mind-brain correlation yielded by NP could, as Varela would have wished, provide compelling evidence against epiphenomenalism or Cartesian dualism (Di Francesco and Tomasetta, 2021).

Perhaps this is another reason for the current focus on NSCs: given that NP does not have a unique theory of how the brain works, there is so far little additional insight to be gained from applying it to everyday examples of lived experience to elucidate their neural and bodily basis. Similarly, the focus on NSCs is understandable given that NP's commitment to tenet 2 – embodiment – still remains in its initial stages: there are isolated attempts at expanding NP to body physiology (Depraz and Desmidt, 2019) and behavioral and social interaction dynamics (Froese and Fuchs, 2012, Froese et al., 2020), although none of these has included brain activity in the analysis as of yet. Accordingly, a systematic integration of extracranial variables with lived experience and brain dynamics in NP is notably lacking.

A step in this more world-involving direction was recently taken by Dumas and colleagues (2020) in the context of social cognition. Briefly, they show that a promising direction for NP is to include more consideration of the constitutive role of others, in line with Varela's (2000) own expectations regarding the future of NP as involving a study of "inter-being". So-called "hyperscanning" brain imaging technology has been becoming more readily available for the neuroscientific study of how two or more people engaged in real-time social interaction can have an intersubjective experience (Valencia and Froese 2020). Accordingly, these advances hold promise to broaden the tenet of embodiment to include the body-, world-, and other-involving bases of lived experience, finally bringing NP in line with its original encompassing vision of "radical" embodiment (Thompson and Varela, 2001).

What then of the wider theoretical implications of NP? Varela was explicit that NP must be a methodological, and not a theoretical, fix to the hard problem. It is nevertheless interesting to reconsider NP in light of the theoretical accounts of consciousness that have proliferated since his passing. Varela (1996, p.330) claimed that "no piecemeal empirical correlates, nor purely theoretical principles, will really help us at this stage". Indeed, while no *purely* theoretical principles will cover Varela's original ambitions, crafting theoretical principles from the innovative experimental results provided by NP may augment contemporary debates on the nature of consciousness that have inspired substantial recent interest. Prior theoretical accounts, according to Varela, sorely neglected one-half of the gap that they sought to explain, thereby generating insoluble problems and *aporias*.

To what extent can we say that the landscape has changed in recent years? Might not more contemporary theories, even those that do not share Varela's radical overturning of the hard problem (cf. Bitbol and Antonova, 2016), nonetheless profit from enriching an aspect of the

explanandum – the irreducible experiential dimension – and the results that this research program has produced?

#### **4. Conclusion**

Most effort in NP thus far has focused on demonstrating the validity of tenet 1 – the use of a disciplined phenomenological pragmatics in cognitive neuroscience. While this has yielded results recognized as valid and innovative, tenets 2 and 3 – embodiment and efficacy – remain vastly under-explored in NP, both methodologically and theoretically. Indeed, tenets 2 and 3 are not independent; it is easier to ignore questions regarding the efficacy of consciousness if, in the experimental context, participants are not actively or meaningfully engaged in embodied interaction with the world. Arguably, the kinds of experiences covered in our case studies, i.e., PIEs, NDEs, ASEs, and NSCs more generally, seem to largely avoid questions regarding active world involvement. As stated, there are valid reasons for applying the tools of NP to reveal such phenomena. As it stands, however, NP's underdevelopment regarding the embodied and efficacious first-person perspective entails that its three tenets remain somewhat disjointed, to the extent that studies adopting NP as a methodology that achieves success in only 1 may potentially be interpreted in a way that is agnostic or even in tension with respect to tenets 2 and 3.

We propose that future NP research can be substantially strengthened by more explicitly engaging with tenets 2 and 3, which will require a much closer dialogue with Varela's other enactive research strands. This can be accomplished by introducing mobile EEG, and EEG hyperscanning, as well as tasks involving decision-making, (preferably those in which the decision is actualized via the body) into established NP paradigms. In return, more theoretical strands would also benefit from closer engagement with practical concerns of experimental research. So, what would a specifically enactive approach to neuroscience look like? Could it form the basis for an enactive theory of consciousness? What does it say about how we should go about integrating extracranial variables into analyses of brain activity? Answering these questions would be a timely endeavor as there is increasing appetite in mainstream neuroscience to revisit traditional assumptions regarding the brain-behavior relationship (Westlin et al., 2023).

In sum, investigating both 'ordinary' and 'non-ordinary' states of consciousness could enable NP to fulfil its bold ambitions by cataloguing a spectrum of otherwise inaccessible (in the case of NSCs) or under-described (in the case of ordinary) experiences and their associated brain-body-environment states. Moreover, cutting-edge NP endeavors may be well-positioned to expand the literature by (re)turning to the paradigms in which: a) the experimental task reveals an unknown dimension of an 'ordinary state of consciousness' (e.g., Lutz & Thompson 2003); b) the embodied dimension of this task is emphasized, with neuroimaging conducted during the performance and c) the agent is observed making a decision in accordance with their lived experience. While accounting for all 3 tenets may be difficult to implement, any such experiment is likely to be rewarding in taking the field toward a more comprehensive and non-reductive account of the embodied mind. In this way, maybe now more than ever before, NP is poised to make a meaningful contribution to both experimental practice and

contemporary theories of consciousness. We hope that this article will inspire researchers to finally realize NP's full potential in practice.

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