

Towards an Active Inference Account of Deep Meditative Deconstruction

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Abstract:

This paper explores the intersection of deep meditative deconstruction, in particular the Buddhist defabrication process and its associated phenomenology, and computational mechanisms under the active inference framework (AIF). We contextualise states such as the jhānas within this process, drawing on both Buddhist theoretical frameworks and contemporary phenomenological understanding. We take a step towards ‘translating’ Buddhist meditation-based phenomenology into computational neurophenomenology. We demonstrate how Buddhist defabrication can be understood as a deconstructive process driving inference ever lower in an agent’s hierarchical generative model by the repeated release of mental tensing associated with clinging and aversion. We cast this release of mental tensing as corresponding to a hierarchical level-specific reduction in belief precision, permitting the interpretation of Buddhist notions such as equanimity and meditative stillness under AIF. We then illustrate the deconstruction process up to its conclusion in a cessation of phenomenal experience, touching on how states traversed during the process may inform areas related to core-knowledge structuring and the generation of experience.

Keywords: active inference, cessation, consciousness, deconstruction, meditation, Buddhist, phenomenology, defabrication

1. Introduction

A core notion shared by both Buddhism and the active inference framework (AIF) in computational neuroscience (K. Friston, 2010; Parr et al., 2022) is that our experience of reality is in a certain sense constructed. Buddhism holds that all experience is transient, and that all phenomena are fabricated (MN35; Ñāṇamoli & Bodhi, 1995). According to AIF, all of our phenomenal experience is given through the brain undertaking constructive perceptual inference to the best explanation for the causes of current sensory input; perception can then be cast as ‘controlled hallucination’. This controlled hallucination includes both the conscious, phenomenal experience of both self and world, in other words, what it is like to experience ourselves and the world around us (Hohwy & Seth, 2020). For Buddhists, deep insight into the constructed nature of the self and world distinction is brought to an end with the collapse of the subject/object distinction as part of the process of achieving full awakening, or arahantship, where a lasting collapse of the misrepresentation of perceptual experience (*avijjā*)¹, results in the end of suffering (Analayo, 2008; Harvey, 2013). For AIF proponents, the subject/object distinction emerges via Bayesian Inference on incoming sense data (Allen & Friston, 2018; Apps & Tsakiris, 2014). These similarities suggest it may be possible to map Buddhist understandings onto AIF computational mechanisms.

Buddhism provides detailed theoretical explanations about the fabrication of lived phenomenal experience. *Fabrication* (*saṅkhāra*) is understood as the construction of conscious perception and experience that arises due to some form of contraction or grasping at how one is perceiving experience (Thanissaro, 2020, p.29; James, 2011; Bodhi, 1980; Walsh, 1995: DN 15; Claxton, 1996). Experience can also systematically be defabricated via meditation and insight, where defabrication is understood as a progressive deconstruction process of releasing grasping and identification with one's perceptual experience (Burbea, 2014; Bodhi, 2000: SN 46.1). One only has to look to the absorption states, known as the *jhānas*, to find defabricated states of perceptual experience, which are claimed to be devoid of materiality, to feature infinite contentless space, or that utterly cease perceptual experience. These states are claimed to be accessible to contemporary practitioners of Buddhist meditation today, with many such states already under active scientific investigation (Laukkonen et al., 2023; Chowdhury et al., 2023; Yang et al., 2023). While this emerging field offers exciting possibilities, much speculation remains regarding the phenomenology and cognitive mechanisms of defabrication (Dahl et al., 2015; Schoenberg & Vago, 2019; Nave et al., 2021; Repetti, 2022; Brandmeyer et al., 2019). To assist this emerging field, we suggest that the gamut of alterations in perception that occur over the course of the defabrication process may be plausibly explained in terms of computational mechanisms at work under AIF. The impact of meditation on the brain in terms of AIF and related frameworks has been explored in a number of papers in recent years (Farb et al., 2015; Pagnoni and Guareschi, 2017; Pagnoni, 2019; Lutz et al. 2019; Deane et al. 2020; Sandved-Smith et al. 2021; Pagnoni and Guareschi 2021; Laukkonen & Slagter, 2021; Prest 2021).

To provide an AIF account of deep meditative deconstruction, we take an approach to understanding defabrication which combines contemporary phenomenology with traditional Buddhist perspectives and frameworks. This allows us to ‘translate’ deep meditative

¹ Buddhist translations used here are from Pali, and will be denoted via italics.

phenomenology into computational neurophenomenology in order to construct computational models of phenomenal experience (Ramstead et al., 2022). Deep Buddhist meditation-derived phenomenology may also illuminate underspecified areas of AIF regarding the structuring of essential core knowledge necessary for predictive models of reality and conscious experience (Ullman & Tenenbaum, 2020, Rorot, 2021). Importantly, we limit ourselves to the defabrication process as undertaken by an advanced insight meditation practitioner in a given meditation session, meaning we take the meditator's pre-existing capacity to defabricate experience as a given.²

Our key proposal is that defabrication during meditation involves a downward cascade of increasingly lower-level belief sampling in the hierarchical generative model, which is reflected perceptually in decreased conceptual complexity. This cascade is a consequence of the relationship between the release of phenomenally experienced mental tensing and a decrease in belief precision at a given level of the hierarchy, with important consequences for active inference and action selection. We argue that the release of tensing, when repeated ever lower in the hierarchy, progressively attenuates the influence of higher-level processing on perceptual content. A progressive pacification of higher-level policies falls out of this understanding, resulting in reduced temporal depth. We demonstrate how this deep deconstruction process plays out under AIF with an illustrative example, referring to associated phenomenology and indicating plausible implicated brain regions.³ We outline how this can result in a 'cessation event'—where all phenomenal experience ceases—as a consequence of insufficient precision over even the hierarchically lowest-level beliefs.⁴

2. Active Inference and Existing AIF Work on Meditative Deconstruction

2.1 Brief Overview of Active Inference Framework

AIF sets out how perception and action may plausibly be intertwined and instantiated in the brain in terms of computational mechanisms by way of its neural process theory (K. Friston

² As a consequence we do not discuss the ample literature on the cultivation of the capacity to deconstruct via meditation, under such terms as decentring (Bernstein et al., 2015), cognitive defusion (Fletcher and Hayes, 2005), dereification (Lutz et al., 2015), opacification (Metzinger, 2003) phenomenal reduction (Varela, 1996) and experiential reduction (Katyal, 2022).

³ We will use 'meditative defabrication' to refer to the Buddhist process specifically, and 'meditative deconstruction' to refer to the AIF interpretation of that process.

⁴ We will employ the term 'phenomenal experience' (or 'experience' as a shorthand) rather than similar terms such as conscious experience, conscious perception or phenomenal consciousness. We do so to avoid confusion given the specific way the term consciousness is used in Buddhist literature and elsewhere. We wish to point to any kind lived experience, or phenomenal consciousness in the Western philosophical sense rather than experiences of or necessarily including some kind of self-awareness or narrative consciousness.

et al., 2017), with these mechanisms argued to underlie our experience.⁵ In this section we briefly review these mechanisms.⁶

According to AIF, the brain approximates Bayesian inference over time by instantiating a system with a hierarchical generative model which generates probabilistic hypotheses, or predictions, about the hidden causes of sensory input (i.e. the causes and states of the generative process that lies beyond the sensory epithelia). Grounded in, and motivated by the free energy principle (Parr et al., 2022), this is known as minimising (information theoretical) surprise or variational free energy and can be considered the same as prediction error minimisation under certain conditions (p. 25). Perception and action are cast as two ways of accomplishing this goal by inference. Perceptual inference brings the model in line with sensory input, and active inference brings sensory input in line with the model. In addition to variational free energy, expected free energy is also calculated for a range of possible action sequences, or action policies (hereinafter, policies; Parr et al., 2022). This speaks to agentic planning, with the winning policy being the one most likely to minimise expected free energy. Calculating expected free energy for policies involves determining both their epistemic value, the expected amount of information to be gained, and their pragmatic value, the probability of preferred outcomes being achieved by following that policy. The framework casts habit formation as a process where expected observations are used to form empirical priors, which are beliefs about how to act in certain contexts that influence policy selection independently of expected free energy (p.93).

The generative model is organised with higher-level beliefs as increasingly general hypotheses or states about the system's sensorium, unfolding at progressively longer temporal scales (Limanowski & Friston, 2020).⁷ Higher levels contextualise lower ones, and lower levels provide evidence for the higher ones (seeing a best friend's face contextualises the presence of their facial features in a certain arrangement, those facial features provide evidence that one is indeed looking at their best friend). The higher levels of the generative model feature increasingly more self-related beliefs, with the highest-level beliefs about causes concerning the self, and lower levels making more detailed short-term predictions closer to sensory input from the sensorium (Limanowski & Friston, 2020).

If the system has high precision over (confidence in) its beliefs at a given level of the hierarchy, it tends to engage in policies expected to produce its preferred outcomes, that is, it pursues pragmatic value. If it has low belief precision, it tends to engage in epistemic value (information or evidence gain) seeking policies, which it expects to increase belief confidence, in order to subsequently enable it to make the best choice regarding a pragmatic policy. Epistemic policies recruit information from lower down in the hierarchy, moving the inference process lower as a consequence (Parr & Friston, 2017). Thus level-specific belief precision influences policy selection, determining where the inference process and perception occur in the hierarchy, with higher confidence driving the system towards

⁵ A neural process theory or process model of brain function specifies the neural processes, in terms of structure, mechanisms and information flow, giving rise to cognitive capacity (Vilas et al., 2022; Andrews, 2021).

⁶ For more detailed introductions to AIF, see Friston (2010a), Smith et al. (2022) and Parr et al. (2022).

⁷ We use 'belief' in the AIF sense of sub-personal beliefs encoded in probability distributions about the causes of sensory input, and not in the sense of conscious beliefs which are available to the system as thoughts in phenomenal experience.

pragmatic value pursuit and higher-level inference, and lower confidence driving it towards epistemic value pursuit and lower-level inference.

Dynamics of how this may plausibly play out have been modelled in deep hierarchical models (K. J. Friston et al., 2017; Heins et al., 2020; Smith et al., 2022, p. 40) featuring two (or more) levels or layers. In these models, if a system is sufficiently uncertain about what it is perceiving, based on its current beliefs about second level (L2) states, it passes related predictions down regarding what to expect at the lower one (L1) and engages in a policy and active inference to entrain its sensory organs—in these models the eyes via saccade—to the predicted best location at L1 to resolve the uncertainty. It then engages in the inference process at L1, sampling its sensory environment, and receiving observations produced by the generative process. Once the system achieves sufficient confidence in its prediction of the causes of its sensorium at that level by iterative (variational) inference, the prediction about that cause is passed up to serve as an ‘observation’ at L2.⁸ This leads to an update to L2 beliefs and leads to a new revised L2 prediction. If still uncertain at L2, then sampling may occur again at L1 in another region expected to reduce L2 uncertainty.

Therefore attentional focus dynamically moves up or down in the generative model depending on belief certainty. As a consequence, and of importance for the arguments to follow, a system confident about its higher-level beliefs is unlikely to engage in epistemic policies to resample at lower levels, and thus attention will foreground content that is more conceptually constructed and abstract (higher up the hierarchy), which serves in the selection of more pragmatically focused policies. With this framing in mind we now review existing work on meditative deconstruction under AIF.

2.2 Existing work on meditative deconstruction under AIF: advances and challenges

Explaining the process of meditation under AIF is an emerging field. Many rich and fruitful explanations have been proposed, either under AIF or under related predictive processing frameworks⁹ that embrace active inference to varying degrees. These include explanations of the process of focussed attention and dereification (Lutz et al. 2019), zen practice (Pagnoni 2019), meta-awareness (Sandved-Smith et al. 2021), attenuation of maladaptive construal of body sensations (Farb et al., 2015), hypnosis and meditation states (Jamieson, 2016), mindfulness based cognitive therapy (Manjaly & Iglesias, 2020), meditation, concentration, insight and learning (Prest, 2021), and meditative selflessness (Deane et al. 2020). Further, Pagnoni and Guareschi (2017) have engaged in a dialogue on predictive processes and Zen Buddhism, while Laukkonen and Slagter (2021) propose a unifying account of how meditation reduces temporal depth. Finally, Pagnoni and Guareschi (2021) propose a ‘work in regress’ mechanism for relaxing precision of ingrained beliefs, finding similarities between their meditative mechanism and one set out by Carhart-Harris and Friston (2019) regarding relaxed beliefs under psychedelics. The proposals by Laukkonen et

⁸ There are different schemes for implementing how and when the system decides to stop sampling at L1. Friston et al. (2017) employ a scheme where lower-level inference terminates once entropy at that level is minimised beyond a fixed value. Heins et al. (2020) employ a scheme where a prior preference exists to stop sampling at L1, which causes sampling to cease when the epistemic value is outweighed by the prior preference to stop sampling.

⁹ For more on the predictive processing framework, see Friston (2010), Hohwy (2013), Clark, 2016.

al. (2021), Prest (2021) and Pagnoni et al. (2021) have offered fertile grounds for providing an account of deep meditative defabrication under AIF. For our proposal, we will build on the strengths of their accounts, while also identifying useful departure points and perceived problematic areas that motivate our approach.

Carhart-Harris and Friston (2019) have suggested that there are psychological and neurobiological similarities between meditative and psychedelic states in attenuating higher-level conceptual processing. This is because both psychedelics (R. Carhart-Harris et al., 2014; R. L. Carhart-Harris, 2018) and meditation (Kakumanu et al., 2018; Vivot et al., 2020; Czajko et al., 2023) have been found to increase brain entropy. Increased entropy (here with regard to psychedelics) is thought to reflect a key phase of the process by which insight occurs. It is proposed that confidence in high-level models (like in the belief in a permanent unchanging self) is relinquished so that content, previously hidden from phenomenal experience by the overwhelming influence of overly confident priors, is now allowed to emerge. This enables fresh perspectives to be entertained, and under these conditions of relaxed high-level priors, disinhibited information can travel up the hierarchy and impress upon consciousness as insights. (Carhart et al., 2019; p. 332). Ingrained prior belief relaxation has been suggested to also apply to meditation with shikantaza ('just sitting') practice in the Japanese Soto Zen tradition (Pagnoni & Guareschi, 2021), while Laukkonen and Slagter (2021) similarly propose that open monitoring meditation can render earlier levels of the hierarchy perceptible (p. 205). Drawing on these proposals by Carrhart-Harris and Friston (2019), Pagnoni and Guareschi (2021) and Laukkonen and Slagter (2021), we identify the reduction in precision (confidence) on high-level beliefs, that may render hierarchically lower level perception perceivable, to be a plausible candidate mechanism involved in the meditative deconstruction process as well.

When considering meditative deconstruction, Laukkonen and Slagter (2021) have proposed a 'unifying account of deconstructive meditation', suggesting that "practising meditation [...] gradually reduces counterfactual temporally deep cognition, until all conceptual processing falls away" (p. 199). We find the claim that 'practising meditation gradually reduces counterfactual temporally deep cognition' to be convincing, yet the argument relies on a proposal that focused attention, open monitoring and non-dual meditation lie on a continuum, with each technique framed as progressively relinquishing "increasingly ingrained habits of prediction, including the predicted self" (p. 207). We suggest that the level of technique is not the most parsimonious level of analysis for describing the deconstruction process or cognitive mechanisms—also utilised by Lutz et al (2019) and Pagnoni (2019)—but rather, the level of the cognitive process of defabrication itself. This is because one technique will not necessarily reliably produce the phenomenal experience it proposes to (Matko & Sedlmeier, 2022; Yaden & Newberg, 2022; Lutz et al., 2015). For example, if practising a non-dual meditation technique, a meditator will not necessarily experience a full non-dual state. Technique is also not comprehensive enough because in deeper states, the technique is often reported as 'dropping away' (Lee Dhammadharo, 1995; Maha Bua, 2012). Nor will practising one technique necessarily lead to the full gamut of meditative experience. For example, although one might practise focused attention for years and experience deeply refined concentrated states, they may never experience a non-dual state, experience selflessness, and might maintain a misrepresentation of perceptual experience due to underdeveloped insight. Hence, it is the process of deconstruction itself, not the technique, that provides the most appropriate level of analysis for developing an AIF account.

Building on this, we suggest it is important for any proposal regarding meditative deconstruction to distinguish between two different temporal scales. The first scale, which we might call the ‘meditative-developmental process’, occurs over an extended period of time (mainly years), normally involving many individual formal meditation sessions in addition to all informal practice. The second scale is ‘one formal meditation session’, occurring over a period of minutes or hours (or days for advanced practitioners). In our view, existing meditation related AIF (and similar) proposals either underemphasize this conceptual distinction, and do not maintain the the dynamics of the two scales sufficiently distinct, or may even unintentionally conflate them.

The meditative-developmental process scale may involve considerable variations in terms of the attenuation of higher-level beliefs (like the belief in an unchanging permanent self), and likely will not follow a linear progression (Galante et al., 2023). For example, a host of psychological complications having been reported by meditators within the context of longitudinal practice (Baer et al., 2021; Britton et al., 2021), and challenging stages in meditative development have long been included in many traditional canonical texts.¹⁰ In developing a framework for meditative deconstruction, an analysis of defabrication over this longer scale would involve accounting for these vast variations and the non-linearity in the attenuation of higher-level beliefs over time. It would require pulling apart the identification of increases in the meditator’s capacity to deconstruct experience at a given moment (say, in a formal meditation session on day 89 of a retreat), from the identification of any changes in a degree of baseline fabrication when engaging in daily existence (say, the perceptual changes still experienced six months after the full 90 day retreat, when compared to before it) plus a host of other variable factors too numerous to mention here (e.g., access to teachers etc.).

It is a simpler and more manageable task to identify deconstruction over the second temporal scale; one formal meditation session. Given a meditator’s current capacities to defabricate, changes may be identified in terms of phenomenal experience, perception and computational mechanisms. This approach sets aside all the non-linear variations that might occur over longer term meditative development, permitting the more precise identification of cognitive processes that can be explained under AIF.

Concerns over the technique level of analysis and the lack of temporal scale differentiation are two reasons we have elected not to fully adopt many of the proposed accounts on offer, though we acknowledge their pioneering contributions. Given all the above considerations and despite our broad agreement with many in the field, particularly the central claim by Laukkonen et al. (2021) of meditation reducing counterfactual temporally deep cognition, we proceed with a focus on the defabrication process and the reduction in precision (confidence) on high-level beliefs as a key candidate mechanism.

¹⁰ See for example the *knowledges of suffering (dukkha ñānas)* in the Theravada Buddhist tradition.

3. A Contemporary Buddhist Phenomenological Approach

To describe Buddhist defabrication in a balanced yet nuanced manner, we believe that combining phenomenological and traditional sources offers the richest explanation of the process. It allows for phenomenological accounts recorded in the literature from meditation practitioners, past and present, who have engaged extensively in Buddhist meditation practices (e.g., Burbea (2014), Pandita & Aggacitta, (2012), Sayadaw (2016), Boowa, (2012)), while also admitting supporting conceptual and textual evidence from traditional sources (e.g., Nagarjuna, Pali canon). This contemporary Buddhist phenomenological approach benefits from not being constrained by rigid or debatable interpretations of purely traditional accounts, nor being overly reliant on questionable contemporary individual interpretation. Rather, it allows for an interpretation in line with established Buddhist frameworks that can be substantiated further with phenomenological reports of those who claim to experientially comprehended said frameworks.¹¹ The aim is to keep any understanding of the construction of experience phenomenologically grounded with the hope that it can also be empirically substantiated.

While we recognize that within Buddhism there are varying understandings of the process of defabrication and cessations, we strive to find common ground here to the extent possible. We acknowledge some of the classification systems and terms we use to be contested and much debated within Buddhist literature, but our choice of said systems and terms stems from either their reported phenomenological existence or their utility in being tractable to interpret under AIF. The understanding of defabrication stemming from our approach may plausibly permit a theoretical AIF explanation of the causes of phenomenal experience and their computational rendering by way of computational neurophenomenology (Ramstead et al., 2022). Additionally, if successful, this AIF account of the Buddhist defabrication process may permit the elucidation of other aspects of the Buddhist project, when they are embedded within or contextualised by the defabrication, enabling their modelling as well. We therefore believe that a contemporary Buddhist phenomenological approach is the most appropriate means of understanding defabrication because it allows us to describe the 'what', and the 'how' of the process in a systematic and, if we are on the right track, empirically substantial manner.

4. Defabrication under a Contemporary Buddhist Phenomenology

Buddhist defabrication comes under many guises, and can also be referred to as the fading of perception (Burbea, 2014, Chapter 19), the pacification of all objectification (Nagarjuna,

¹¹ We do however humbly acknowledge that what is considered an 'advanced meditator' is highly debatable, and are open to the possibility that what is considered advanced in one context might be seen as elemental in another. What we have at hand are claims, so we simply must utilise the apparently most reliable phenomenological claims, while acknowledging said claims may be over assumptions.

1995, v. XXV:24), or the unbinding of conditioned experience (Bodhi, 2012; AN 9.34). The process of Buddhist defabrication is incredibly detailed, with multiple strands one could in principle follow. Here, we attempt to follow a reasonably linear thread and limit our discussion points to primary concepts within our contemporary Buddhist phenomenological approach. This section outlines how our approach understands defabrication and cessations, how releasing mental grasping leads to defabrication and the parallel routes of the samatha jhānas and insight knowledges that produce defabrication, before finally describing the process of defabrication that could occur in one given meditation session of an already advanced practitioner.

4.1. Fabrication and defabrication in Buddhism

Fabrication in Buddhist terms is understood as the constructed process that arises due to some form of contraction or grasping at how one is perceiving experience, and defabrication is understood as a process of releasing grasping and identification with one's perceptual experience. The most extreme level of defabricating release in Buddhism is extinguishment (*nibbāna*, liberation) and the most extreme level of fabricated contraction are the depths of extreme suffering (*dukkha*). So Buddhist defabrication lies along a continuum or spectrum, with extreme suffering at one end, and extinguishment or liberation at the other.

Before moving on, we must first attempt to disambiguate the term 'cessation', as one of its meanings will serve as a key reference point in discussing the defabrication process. We acknowledge that interpretations of cessations vary significantly across various practitioners or lineages, and we simply present the available phenomenological, empirical and traditional interpretations we find in the literature. The term can be used in various ways and we identify here five kinds of cessation which may occur during the defabrication process of Buddhist meditation:

(1) Immutable cessation of Nibbāna, which over the course of longitudinal meditative development permanently reduces a degree of fabrication in experience and is associated with having achieved some degree of awakening, such cessation is sometimes called 'fruition' (*phala*; Sayadaw, 2016, pp. 445–446). After gaining immutable cessation of Nibbāna, a meditator may also enter into 'supramundane absorption with Nibbāna as object' via the process described in (3) (Bodhi, 2016).

(2) Temporary yet protracted-cessations of elements of experience, yet not *all* experience, via recognition of the emptiness (*śūnyatā*) of perceptual phenomena. Such cessations can occur when releasing perceptual phenomena while moving through the jhānas, or via development of clarity into the three characteristics; namely *suffering* (*dukkha*), *non-self* (*anattā*), and *impermanence* (*aniccā*).

(3) An altered state of momentary full cessation of phenomenal experience *after the full traversal* of the samatha jhānas (concentrative meditative absorptions) or insight knowledges (vipassana-ñānas)¹², where there is an absence of consciousness yet a subsequent

¹² As a general rule, we refer to Buddhist terms by their English translation, however, for some terms such as *samatha* and *jhāna* where we use the Pali source term, either because the translation has misleading connotations in English, such as for *samatha* or because it is in relatively common usage, such as for *jhāna*.

awareness of the state having occurred (Bodhi, 2016, pp. 358, 363; Sayadaw, 2016, pp. 445–446; Berkovich-Ohana, 2017; Chowdhury et al., 2023). This can be accessed without having previously attained (1) (Bodhi, 2001; Gunaratana, 1980) via cessations described in (5)¹³, or, via having previously attained ‘supramundane absorption’ as described in (1). If it is (1), the Abhidhamma (Thera, 1979) suggests the state is what immediately follows ‘fruit consciousness’ (*phala*) and the Mahasi School of Theravada Buddhism refers to the state as ‘fruition’ (Sayadaw, 2016).

(4) An altered state of momentary full cessation of phenomenal experience *at any point along the meditative development trajectory*. Some refer to it as a state where no active conscious processing occurs (Bhavaṅga; Collins, 1982, p 241-247) and may interpret it as a profound and positive experience and go as far as equating it with fruitions as described in (1), or jhānas described in (2). However, others interpret it as an obstacle to meditative development, and equate it to a state where nothing is perceived at all due to weak mindfulness (*asaññi-bhava*; Thanissaro, 2006, p. 65), and even ‘wrong samādhi’ and wrong release (Lee Dhammadharo, 1995).¹⁴

(5) There are two other types of cessation with no experience, *nirodha-samāpatti*, the attainment of cessation (Bodhi, 2005, SN 28.9, Laukkonen et al., 2023), and *animittasamādhī*, a cessation of any concepts (signs) by which something is recognised (Ñāṇamoli, 1995; MN 43, MN121), which both usually (but not necessarily) lead into (1) afterwards.

Our focus here will be on cessation types (2) and (3). To avoid ambiguity, we will refer to (3) as a *cessation event* and refer to (2) in context-related descriptive terms without employing the word ‘cessation’.

In more specific terms, the phenomenology of cessation events (3) has been described by Ingram (2018) as “like an utter discontinuity of the space-time continuum with nothing in the unfindable gap, exactly like what happens when someone edits out a frame or sequence of frames of a movie” (p. 256). Such events represent a temporary end point to the fabrication process, with Burbea (2014) noting that:

At the extremity of the more subtle end of the continuum, in a moment when clinging, identification, and grasping at inherent existence are pacified, there is the cessation of perception [...] [T]he cessation of perception comes about through a dying down of fabricating. (pp. 229, 230)

¹³ Most Theravādan sources suggest that mundane (*lokiya*) jhānas are not sufficient or indispensable for attaining supramundane (*lokuttara*) liberation. Cessations after the jhāna traversal do not necessarily result in liberation, which would be the event that could further produce a supramundane absorption (Bodhi, 2012: AN 5.166, Walshe, 1995: DN9). However, traversal through the mundane jhānas can result in liberation if ‘one inclines one’s mind’ with insight into the fabricated or impermanent nature of existence, or into the factors of awakening (Bodhi, 2005: SN 46.76; MN121; Ñāṇamoli & Bodhi, 1995).

¹⁴ Debates around the utility of this state are contentious. However, we include it here as it does appear to be a type of cessation that can be accessed through meditative deconstruction and has been discussed in recent literature, regardless of its perceived utility.

Therefore, a meditator can understand that they have fully defabricated phenomenal experience by entering the non-state of a cessation event.¹⁵ We now proceed to examine the key mental move identified in Buddhism and its associated phenomenology that moves the defabrication process forward.

4.2 Defabrication involves letting go of mental tension which increases equanimity

The experience, the perception of a phenomenon, depends on clinging. For a thing to appear as that thing for consciousness, to be consolidated into an experience, it needs a certain amount of clinging. (Burbea, 2014, p.228)

Defabrication involves a gradual process of letting go of perceptual construction. In essence, this is a process of refinement, where coarse or ‘sticky’ fabrications are progressively released resulting in more subtle modes of perceiving experience. This is a process of calming (*passaddhi*), a gradual stilling or freeing from contracted (*saṅkhittam*) fabrications or constructions. These contracted fabrications are accompanied by wanting or not-wanting for phenomena (craving or desire; *taṇhā*) to be a certain way. The contracted states are typically experienced as progressively coarse appearances of pleasant or unpleasant feeling tones (*vedanā*). Both kinds of feeling tones produce discontent (*dukkha*), or negative affective valence through grasping (*upādāna*) or aversion (Burbea, 2014, p. 104). The greater the mental contraction, the greater the degree of reification and identification with perceptual phenomena. But releasing mental tensing reduces contraction, which in turn produces de-identification with perceptual phenomena and increases positive valence.¹⁶

Phenomenologically, the contracted craving for phenomena to be a certain way shows up in experience as mental tensing. Burbea (2014) notes that “the body can reveal the presence of clinging, because any grasping or aversion will be mirrored in a palpable feeling, usually of contraction or tensing, either in a particular area of the body or in the whole body sense” (Ch. 13). Releasing that mental tensing can thus be considered doing less. Therefore, progressive defabrication involves progressively less doing and occurs through letting go of mental tensing. This process leads to the stilling of fabrications, or what is otherwise known as a state of increased equanimity, the capacity to remain non-reactive yet open to what arises in experience. Burbea (2014) notes the relationship as follows:

[E]quanimity – the dying down of the mind’s push and pull with respect to phenomena – does not reveal a world of things, in their pristine ‘bare actuality’, ‘just as they are’, stripped only of the distortions of ego projections and gross *papañca*. Rather, as meditative skill develops, we see that without clinging phenomena do not appear at all. Not only how they appear, but that they appear is dependent on the fabricating conditions of clinging. (Chapter 19. The Fading of Perception)

¹⁵ By ‘non-state’ we mean a state where there is no phenomenal experience.

¹⁶ We use the terms negative or positive valence relative to one’s current valence in phenomenal experience. That is, positive valence refers to increasing the pleasantness of experience from what it currently is or just was, and negative valence refers to increasing the unpleasantness of experience from what it currently is or just was.

That is, perceiving with more equanimity is perceiving with less fabrication in experience. Equanimity as such changes what we perceive rather than providing us with access to ‘the way things really are’. Therefore, the degree of equanimity also tracks with degree of (de)fabrication. We move to more pleasant affective valence and become less reactive to phenomena as contracted fabrication, manifesting in mental tensing, is reduced.

4.3. Two parallel routes

As mentioned earlier, the extreme end of defabrication is a cessation event which may be accomplished temporarily by the kind of meditator specified earlier, either by progressing through the samatha jhānas or insight knowledges¹⁷ (Buddhaghosa, 2020; Sayadaw, 2016). The jhānas are a set of tranquil meditative absorption states accepted by most Buddhist schools (Burbea, 2014; Ṭhānissaro, 2006; Polak, 2011; Arbel, 2017), while the insight knowledges are adopted from the Abhidhammatthasaṅgaha and are utilised only in some Theravādan traditions, predominately Burmese Buddhism, and are not widely accepted in other Buddhist traditions (Anālayo, 2022, pp. 172–177). The insight knowledges are a proposed developmental sequence (cf. Grabovac, 2014) characterised by specific changes to emotions, cognitions, perceptions, feelings and consciousness” (Chowdhury et al., 2023, p. 4). As they are argued to form a tractable schematic framework, we include them here as a tool to help explain the defabrication process via insight route.

There is much debate on these two routes to a cessation event and the relationship between them, yet here we take the position that the paths may be considered as parallel, in terms of moving phenomenal experience toward a cessation event by progressively releasing craving and mental tensing. This largely corresponds to the framing set out by Pandita and Aggacitta (2012), with commonalities and correspondence between the samatha jhānas and the insight knowledges specified.¹⁸ However, we adopt a more spectrum based approach. At one end there is very little flux of phenomena in experience and higher affective valence on the jhāna side. At the other end there is a very high degree of flux of sensations and a relatively lower affective valence on the insight side.¹⁹ Burbea (2014) speaks to such an understanding, noting that “[a]t each stage [of the fading of perception] then, one may keep pressing on with the insight way of looking, or choose to spread and stabilise whatever perception is now there into a corresponding state of samādhi” (p.238).

Although we cover both jhāna and insight variants of the defabrication process, we will focus more on the jhāna side, as their higher degree of uniformity makes them easier to phenomenologically present.

¹⁷ Also known as the *stages of insight knowledge*, *stages of insight* or *progress of insight* (Sayadaw, 2016, Chapter 6; Pandita & Aggacitta, 2012, app. The Progress of Insight).

¹⁸ Pandita and Aggacitta do this by initially setting out ‘vipassana jhānas’ which have their samatha jhāna counterparts, and then grouping the insight knowledges under the vipassana jhānas.

¹⁹ Our position here is a spectrumisation of the work of Pandita and Aggacitta (2012) with the layout of samatha- and vipassana jhānas, with the insight knowledges being grouped under the vipassana jhānas allowing for the samatha jhānas to correspond to insight knowledges.

4.4. Releasing into the jhānas

The formed jhānas

What does this progressive defabrication look like in a single meditation session? Burbea (2014) suggests that any state of *samādhi* (including the jhānas) is to some degree a state of letting go and reduced craving, and in regards to defabrication through the jhānas suggests:

What is happening here is most accurately regarded as a progressive non-fabrication of perception. Indeed the Buddha called the jhānas ‘perception attainments’— not because higher states of jhāna are fabricated more and more, but because progressive states of jhāna are fabricated less and less, and themselves fabricate less and less. (sec. Emptiness and the Jhānas para. 2)

As the mediator takes up a centralised object of mindfulness (*parimukham*; either bodily, sensory, or mental activity) with greater attentiveness (*vitarka*) and investigation (*vicāra*), they start to withdraw (*vivicceva / vivicca*) from sensory (or sensual; sights, sounds etc.) disturbances and unskilful elements of mental or conceptual proliferation (*papañca*) and hindrances (*nīvaraṇa*), that are distractions of mental origin. Thus begins the process of unbinding or releasing, and gradual stilling of perceptual experience. The greater the meditator withdraws, uncouples or unbinds their grasping and identification with fabricated mental activity, simultaneously, pleasant mental states of freeing rapture (*pīti*) and non-sensual (i.e., bodily) states of happiness, ease or pleasure (*sukha*) arise within the purview of perceptual experience. These experiences are lighter, brighter, more ‘open’ than the contracted perceptual states one normally experiences. This first step in the stilling or fading of perception is known as the first jhāna. In this state, the five hindrances cease (Ñāṇamoli, 1995; MN43).

This refinement process continues as the meditator becomes progressively more enveloped in the stilling of perception via releasing coarser elements of fabricated appearances. Even the effortful process of attentiveness and investigation begins to feel too coarse, so is naturally released. Effortful directing is succeeded by a more subtle process of calming (*passaddhi*) that stabilises the meditator into inner tranquillity (*sampasādāna*) and a unification of awareness (*ekaggatā*) imbued with the freeing rapture and happiness of the first jhāna. This freer, spacious, open and clearer state of experience is known as the second jhāna, where contracted grasping to any sensual experience starts to cease and naturally drop away. The meditator then moves further down and continues to release those more subtle fabricated aspects of experience. In the third jhāna, the meditator releases subtle fabricated tension of the freeing rapture, and moves into a state of meditative equanimity (*upekkhā*), which is enlivened by mindful awareness (*sato*) and a clearer comprehension or knowing of phenomena (*sampajañña*) that is still accompanied by happiness. This refinement process continues, and even happiness fades in the fourth jhāna as more subtle craving or aversion towards anything pleasurable or painful—gladness (*somanassa*) and discontent (*domanassa*)—is released, and the meditators mind drops to the state of refined mindful equanimity (*upekkhāsatipārisuddhi*), experienced as (temporary) freedom from pleasure and pain (*adukkhamasukham*). This is not an anhedonic or apathetic state, yet one of bright, refined contentment pervading the entire sphere of conscious awareness of being (Bodhi, 2012: AN 5.28). It contains a deep fulfilment and satisfaction, and a ‘happiness or

peace beyond the world (Norman, 1997; Dhṛp 110; Dhṛp 372-74) that arises through the stilling of the mind.

Absorbing into the formless

Even these refined fourth jhāna states can be perceived as confining or contracted, revealing ‘further freedom’ to be unveiled (Bodhi, 2012; AN 9.42; Ñāṇamoli, 1995; MN111). This means that aspects of experience have yet to cease; refined mindful equanimity still is experienced, as the perception of elements associated with form remains. Form (or materiality) refers to phenomena in experience which are attributable to either an external source (i.e. the five senses) or the body. ‘Formless’ thus refers to phenomena which are not perceived as originating from the external world via the five senses or the body. To further move towards opening, stilling and freedom of release from contracted material sensory states, one can access the formless jhānas (*arūpa-jhānas*) or formless (or immaterial) dimensions of awareness, which are even more refined meditative states where all aspects of perception of the traditional sensory world progressively defabricate and drop away.

As perceptions of form (*rūpasaññānaṃ*) cease, the meditator progressively releases very subtle perceptions of diversity (or dualistic multiformity; *nānattasaññānaṃ*) and perceptions of bounded (sensory) resistance or impingement cease (*paṭighasaññānaṃ*), and with that enters the fifth jhāna of perceiving boundless space (*ākāśānañcāyatana*). Even perceiving the dimension of boundless space can be seen as confining though, and the meditator can defabricate this perception, allowing it to cease and thereby enter the sixth jhāna of perceiving a boundlessness of consciousness (*viññāṇañcāyatana*). This has been described as consciousness and presence pervading the field of phenomenal experience (Ingram, 2018, p. 173-174). When the perception of the boundless consciousness feels too contracted, the meditator can defabricate it to realise a dimension of nothingness (*ākāśaṇṇāyatana*) in the seventh jhāna. By this point there is no longer a perception of space in experience, as Burbea (2014) notes, “[b]y the seventh jhāna, the sphere of nothingness, any perception of space is replaced by a sense of nothingness.” (sec. Emptiness and the Jhanas para. 1). That is, the sense of spatial orientation, which previously appeared devoid of sensory objects with the fifth jhāna, is now phenomenologically absent. Yates et al. (2017) describe seventh jhāna as a mental fabrication of the interpretation of an absence of sensory input, stating “that the base of nothingness represents an *absence* [their emphasis] makes it unique among all other mental constructs, which inevitably represent different kinds of presence” (sec. The Formless Jhanas, para. 4).

However, that experience of perceiving ‘nothingness’ still occurs in the seventh jhāna, meaning there is extremely refined contraction there of the experiencer themselves, which produces very subtle constriction. By releasing this, ‘nothingness’ ceases and the meditator enters the eighth jhāna of neither perception nor non-perception (*nevasaññānāsaññāyatana*). Phenomenologically this is generally regarded as essentially ineffable yet still a phenomenal state of some sort (Ingram, 2018, p. 178). Although it seems like there would be no further defabrication beyond this state, further unbinding is possible through a cessation event.

4.5 Release through the insight knowledges

The relationship between insight practice and the defabrication process is characterised by Burbea (2014) as phenomena fading in experience as one adopts an ‘insight way of looking’, that is, one which investigates one of the three characteristics: impermanence, suffering and non-self (Payutto, 2015, pp. 101-157). Less experienced clinging at a given moment results in less fabrication.

The insight knowledges have been described as distinct states of consciousness which each have a unique perspective (Kornfield, 2002). Analayo (2012) claims that the different knowledges tend to place more emphasis on one of the three characteristics or another. While the first three knowledges²⁰ do not feature an emphasis, the knowledges of *arising and passing* and *dissolution* emphasise the impermanence characteristic. The knowledges of *fear*, *misery*, *disgust* and *desire for deliverance* emphasise the suffering characteristic, and the knowledges of *re-observation* and *equanimity* place emphasis on non-self.

To defabricate experience to the point of a cessation event via the insight knowledge route, one must develop and move through the knowledges starting with the *knowledge of arising and passing away*, passing through the knowledges of *dissolution*, *fear*, *misery*, *disgust*, *desire for deliverance* and *re-observation* until the *knowledge of equanimity* (Buddhaghosa, 2020, pp. 732–733).²¹ When *knowledge of equanimity* is mature one then moves to *knowledge in conformity with truth (saccānulomikañāṇa)* followed by *knowledge of change-of-lineage (gotrabhūñāṇa)* and then directly to the cessation event, that is, the cessation of the ‘conditioned phenomena’ that the meditator has been observing (Sayadaw, 2016, p. 448).²²

We have now presented two related routes, the samatha jhāna route and the insight knowledge route, which are displayed in Figure 1 (mapping schemas and translations based on Sayadaw (2016, Chapter 6, pp. 303-468), Grabovac (2014), Pandita & Aggacitta (2012) and Ingram (2018)). An advanced meditator travelling either route in a meditation session will bring about progressively defabricated experience moving them to a cessation event resulting in absence of phenomenal experience. Though different meditative moves according to the route, they progressively release mental tensing which reflects the degree of fabrication in experience. This release of mental tensing will play a key role in our AIF deconstruction account, yet first we turn our attention to the relationship between AIF and phenomenal experience.

²⁰ We note that Analayo groups these three insight knowledges together as ‘comprehension’.

²¹ While terms such as dissolution, fear, misery, disgust, desire for deliverance, might be perceived as negatively valenced, they are understood in the context of perceiving the drawbacks of grasping at phenomena which produce suffering (*dukkha*), which as outlined 4.2, produces positive valence.

²² There may be a third route to releasing clinging and advancing the mind to a cessation event, by directly attempting to release any mental tensing perceived in the mind. This route, targeted in practices like Do Nothing, Shikantaza (‘just sitting’) and Choiceless Awareness (Taft, 2017; Young, n.d.), appears to involve similar phenomenology to the insight route, with experience characterised by flux, and progressively moving to more equanimous and positively valenced, yet less fabricated, experience.

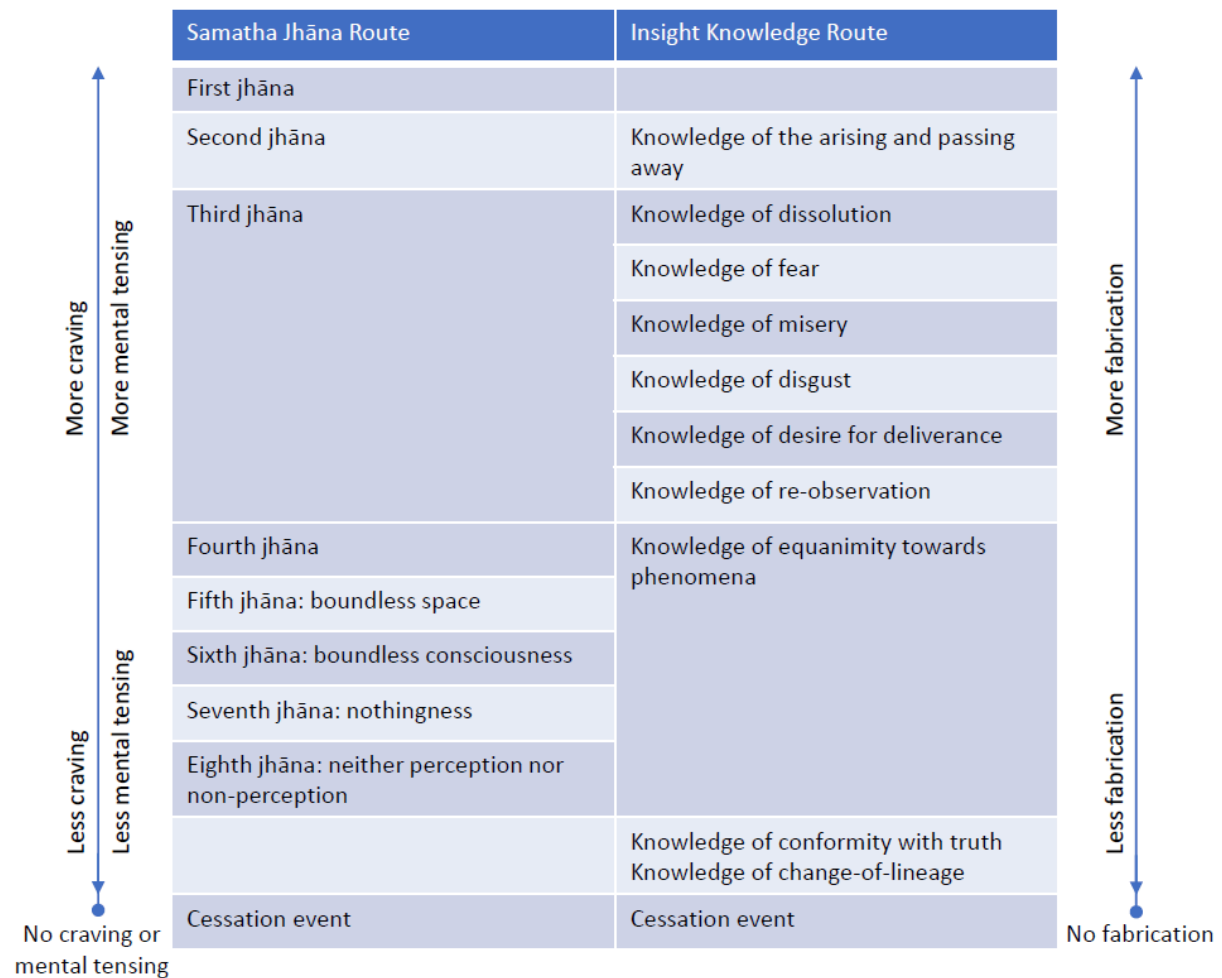


Fig. 1 Two defabrication routes to cessation events

The two parallel routes should be thought of as operating on spectrum from left to right. Either jhāna (left column) or insight (right column) can be more or less prevalent at any moment (degree of weighting on the spectrum), but typically move downward via progressively releasing craving and mental tension (left arrow). This progressive release reduces fabrication (right arrow), moving phenomenal experience downwards towards the cessation event (bottom row).

5. The Active Inference Framework and Phenomenal Experience

Under AIF, phenomenal experience is associated with the system's posterior belief after having engaged in inference, and is thus the upshot of an otherwise unconscious process (Hohwy 2013, p. 201; Friston 2013, p. 39; Seth and Friston, 2016, p. 5). To tie this understanding in with the hierarchical movement of the generative model, we will now examine the relationship between hierarchical inference and phenomenal experience through AIF interpretations of empirical work on binocular rivalry.

In binocular rivalry, two different images are presented, one in each eye, resulting in phenomenal experience alternating between the two rather than being a presentation of two overlapping images. Hohwy et al. (2008) and Weirhammer et al. (2017) argue that predictive coding (Rao & Ballard, 1999; an exclusively perceptual-inference based

antecedent of AIF) provides an explanation for rivalry; if the rivalry images are a car and a house, it is statistically unlikely to experience both in the same spatial location at the same time, so only one can be the best explanation at a given time and is consequently perceptually represented. However, the incoming sensory evidence for the perceptually suppressed stimulus persists and cannot be explained away, eventually leading to the alternation in experience between the rival images. Notice that this presentation of either the car or house also includes conceptual information related to the identity of the object. 'Car' entails an association with all the understandings and action opportunities associated with the concept 'car' (including, for example, policies for eye movements to high precision sensory attributes, such as the locations of the wheels, to reduce uncertainty about if one is looking at a car), and 'house' entails an association with the understandings and action opportunities associated with the concept 'house'.

Studies on rivalry in meditators further illuminate how this works. Laukkonen and Slagter (2021) note that meditation appears to impact even basic perceptual predictions, citing a study on Buddhist monks (Carter et al., 2005), where the otherwise brief transition or 'mixed percept' periods, experienced as mixed patches from each image, were reported by one monk to be prolonged. Laukkonen and Slagter interpret this as evidence that the monk's prior belief that 'two images cannot appear in the same spatio-temporal location', which is usually the case for visual perception, as having broken down. Another study (Katyal & Goldin, 2020) found evidence that meditation increases mixed percepts in long-term meditators, suggesting that this indicates the disabling of bottom-up sensory information being communicated to higher order regions (p. 21). This can be understood as the elimination of rivalry due to higher conceptual levels, where the stimuli presented to each eye compete for the best explanation, having been attenuated, with this likened to perceiving something more like pixels instead of objects made out of those pixels (cf. Prest, 2021, p. 41).

Such work paints a picture where meditators' phenomenal experience appears to feature less higher-level conceptual (or abstract) representation of the generative model. If an explanation for the sensory input, and the lower-level information integrated into it, occurs hierarchically higher up then experience correspondingly includes more conceptually constructed content. In rivalry, with the car/house example, this is at a hierarchical level where 'house' or 'car' can be identified by the system. If the explanation, and the lower-level information integrated into it, lies lower down, then experience reflects representations closer to sensory input, e.g., at a level below concepts such as 'house' or 'car', where the overlapping visual information from both images does not demand mutual exclusivity since there is no attempt to conceptually integrate both stimuli (Figure 2). Therefore, in rivalry, if an individual reports 'house' or 'car' dominating then their phenomenal experience is associated with information integrated higher up the hierarchy, and if they report 'mixed percepts' then their experience is associated with lower-level integration.

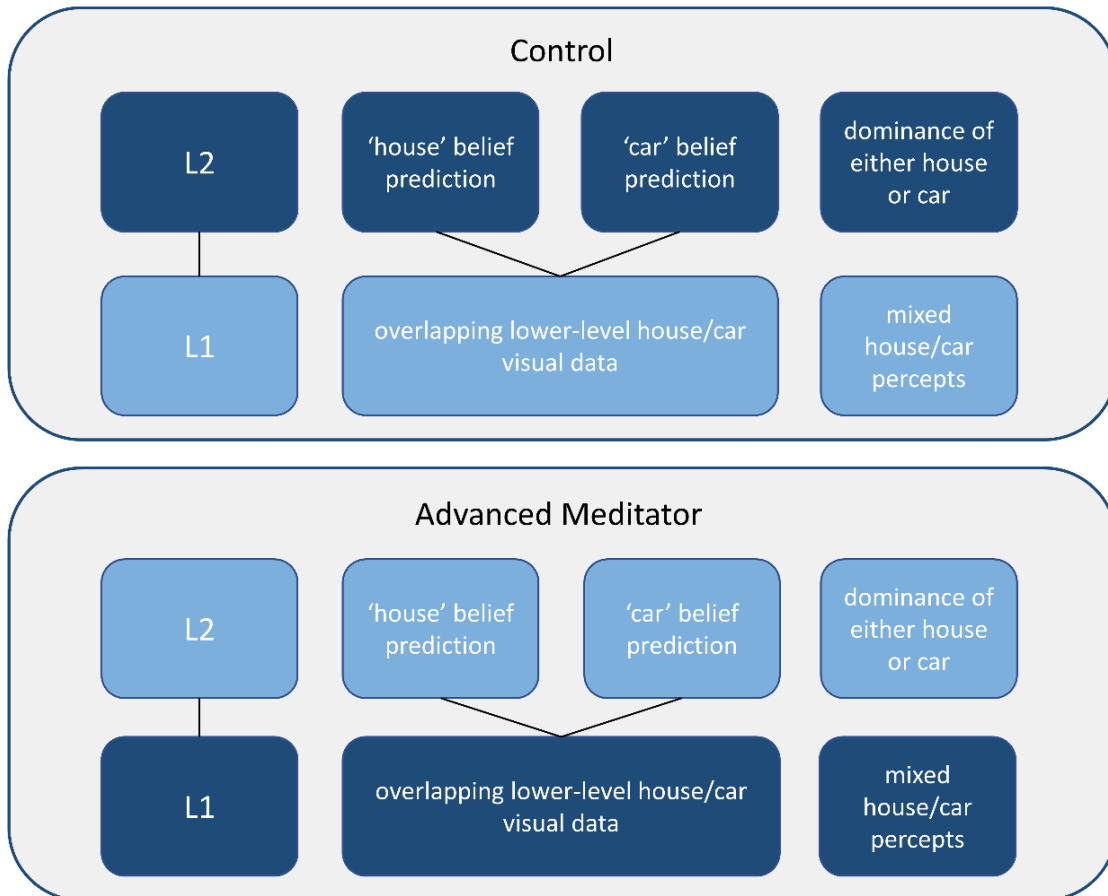


Fig. 2 Phenomenal experience and hierarchical processing of meditators under binocular rivalry
 Top panel represents rivalry with control group. Darker boxes represent beliefs featured a higher proportion of the time in phenomenal experience. Lighter boxes represent beliefs featured a lower proportion of the time. Bottom panel represents rivalry with advanced-meditator group. Here, decreased proportion of L2 beliefs leads to more time perceiving mixed percepts.

We can also look at this hierarchical understanding of phenomenal experience in terms of associated active inference. Recognising a car or a house involves saccades of the eyes moving around the image, and/or shifts in covert spatial attention, to confirm the types of patterns predicted to be there if one is indeed perceiving that object (K. Friston et al., 2012; Mirza et al., 2016, Slotnick and Yantis, 2005). Saccades may seek to confirm features as lines, shape, texture and so on, and their configuration in relation to each other. When perceiving mixed percepts the eyes would no longer be engaging in saccades to confirm the current hypothesis at the higher level of conceptuality. ‘I am perceiving a car’ does not need to be confirmed, meaning active inference would engage to confirm simpler hypotheses, such as ‘I am perceiving a vertical light-dark contrast’. Furthermore, the system must have a best explanation that it is perceiving a car in order to engage in policies contingent upon having recognised a car. Recognising lines, shape and texture do not invite action to ‘open the door and get in’.

Having reviewed the relationship between hierarchical predictive mechanisms and phenomenal experience, we now develop our account of deep meditative deconstruction.

6. Deep Meditative Deconstruction under the Active Inference Framework

We now investigate how mental tensing may plausibly function mechanistically, proposing how the Buddhist defabrication process, as enacted by advanced meditators in a given session, deconstructs experience.

6.1. Casting the release of mental tensing as a reduction in belief precision

The starting point for this account is the meditator—hereafter called ‘the system’—having achieved an on-demand capacity to perceive subtle mental tensing.²³ Perception of such tensing necessarily means the establishment of beliefs about whether or not, and to what extent, tensing is being experienced at a given moment. These beliefs form a part of the system’s best explanation for current sensory input. As all perceptual content is understood to come with associated tensing, the system can target the adaptive disengagement from the inference process at a given level of the hierarchy by stopping the associated tensing. As noted earlier, Carhart-Harris and Friston (2019) suggest that high precision (overly confident) priors must be relaxed in order for information to travel upwards and ‘impress on consciousness’, with Pagnoni and Guareschi (2021) proposing a similar mechanism for Soto Zen meditation. while Laukkonen and Slagter (2021) similarly propose that open monitoring meditation can render earlier levels of the hierarchy perceptible (p. 205)

We therefore propose that the release of tensing at a given level correlates with decreased precision on beliefs about the state of the world (and system itself) at that level (as well as on beliefs about the tension experienced in relation to them). Let us unpack some immediate consequences of reduced belief precision which were touched upon earlier. With the inference process running at a given level of the hierarchy, the system will aim to resolve insufficient precision by engaging in epistemic foraging, selecting policies entraining actions that resample the level below with the aim of re-establishing the initial level’s belief precision (Figure 3). Under AIF, uncertainty reduction here is a better path to expected free energy minimisation than pragmatic policies based on increasingly imprecise beliefs; the less certain we are, the more we seek to reduce our uncertainty rather than engaging in pragmatic value seeking actions based on our current, uncertain knowledge.²⁴ In other words, as beliefs are rendered uncertain via the release of mental tensing, the system increasingly favours the selection of information seeking policies that invoke lower-level inference rather than acting on current (now uncertain) higher-level knowledge in pursuit of perceived exploitable value. As discussed regarding binocular rivalry, moving hierarchically downward reduces the complexity of phenomenal experience (e.g., experience changing from perceiving the concept ‘snake’ to perceiving some feature of the snake such as its shape), yet for deep deconstruction the process must repeat.

²³ See Prest (2021) for a one predictive processing account of how this may plausibly occur.

²⁴ See Parr et al. (2022, sec. 2.8) for the precise mathematical formulation of the relationship between expected free energy (EFE), information gain and pragmatic value, yet put simply $EFE = - [Information\ gain] - [Pragmatic\ value]$ (p. 33).

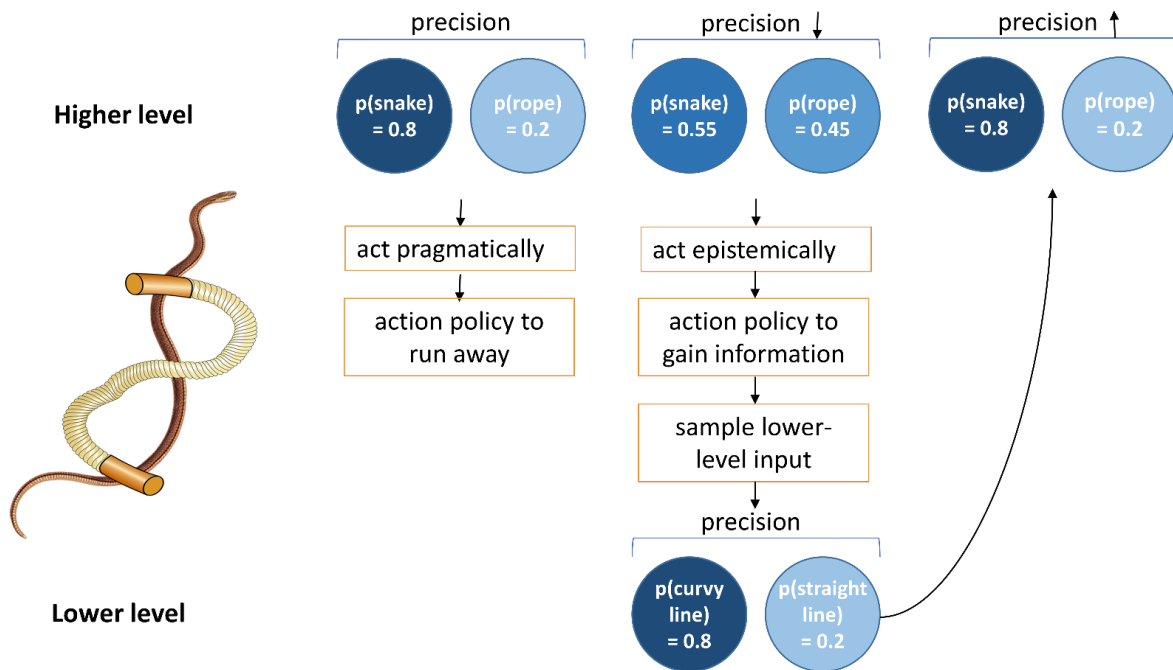


Fig. 3 Lower-level inference via decreased higher-level belief precision

Two higher-level beliefs, that the system is perceiving a snake or a rope (left column) in a probability distribution. Decreasing the precision over that distribution (middle column) decreases certainty about perceiving a snake or a rope. This tilts the system toward favouring epistemic over pragmatic value pursuit, with an epistemic policy being selected to gain more information which results in inference being undertaken at the lower level (in this case about the shape of the perceived object). Once lower-level inference is completed, confidence about higher-level beliefs can be reestablished (right column). Snake (Pointon, 2018) and rope (Frank, 2012) CC0 1.0.

Under normal conditions, having hierarchically moved one level lower, the system would then successfully resample via inference at that level, with this followed by a subsequent move back up to now reestablish higher-level belief precision again. This is why the same move to target the release of mental tensing must be undertaken again at the lower level. So under the conditions of meditative deconstruction, instead of moving back up, beliefs at the lower level are *also* rendered increasingly imprecise, attenuating pragmatic policies at that level in favour of even lower-level information seeking. In this way, the system moves epistemic foraging ever-lower in the hierarchy as the probability of pragmatic policies decreases at each subsequent level due to the ever increasing relative weight of epistemic policies. This results in reduced (functional) hierarchical depth, entraining a reduction in temporal depth as a consequence.

6.2. The pacification of action

We argue that a key consequence of the sustained repeated release of mental tensing (decreased belief precision) at progressively lower levels of the hierarchy is the attenuation of increasingly more subtle (shorter temporal horizon) policies being pursued by the system.

As we have discussed, policies are constituted of a sequence of actions expected to achieve pragmatic or epistemic value, and pragmatic policy selection is increasingly reduced at a given level of the hierarchy via the release of mental tensing. This drives the system to select epistemic policies moving the system down to lower-level inference. A reduction of

temporal depth and the attenuation of gross action fall out of this. In the snake/rope example from Figure 3, the sequences of actions entrained by a confident identification of a snake, being hierarchically higher up, occur over a longer temporal horizon than the confident identification of less processed perceptual elements hierarchically lower such as visual patches, edges or lines. Similarly, identification of one's best friend (higher-level belief) and policies based on this occur over a longer temporal horizon than identification of an object being a human (comparatively lower-level belief). In both cases, moving from the higher to the lower level thus reduces the temporal depth of policies, restricting the action space to more subtle potential actions (See Figure 4). In other words, if the conceptual beliefs that trigger goal-driven action sequences are too uncertain, the system becomes restricted to selecting and enacting policies, underpinned by less conceptually complex beliefs, which are constituted of more subtle actions, 'stilling' or 'pacifying' the system. For the defabricating meditator, this translates into less conceptual experience arising from shorter physical²⁵ or mental sequences, and is how the release of mental tension and corresponding higher-level attenuation progressively reduces gross action and increased experiential stillness. As an example, consider that sustained thoughts about one's self in relation to others are underpinned by high-level beliefs about 'oneself' and others. The system must be running the inference process high up the hierarchy for such beliefs to be reflected as conceptual understanding in experience. Thus the meditator defabricates and starts constraining experience to the posterior beliefs of lower-level inference. The insufficient higher-level belief precision means they avoid selecting and enacting policies in response to goals (preferences) pertaining to the high-level self and other beliefs. For advanced meditators, such policies will tend to consist predominantly of mental rather than physical actions, phenomenally experienced as grasping or aversive thoughts (ones in pursuit of pragmatic value), which are reflected in activities such as mind wandering.

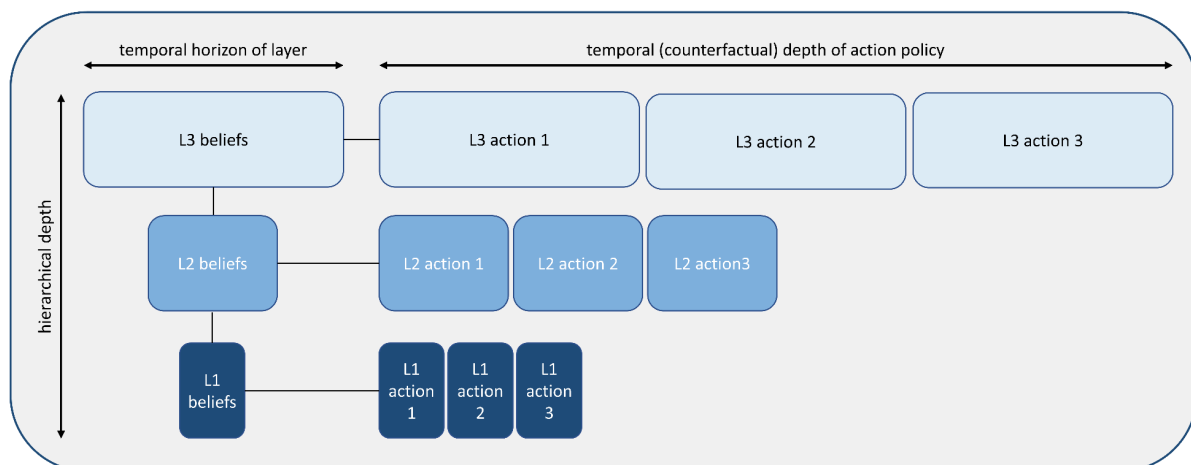


Fig. 4 Decreased temporal depth during meditative deconstruction

Reducing precision on Layer 3 (L3) conceptual beliefs, represented in phenomenal experience, undermines policies at that level of hierarchical depth. Here, L3 beliefs have been rendered too uncertain to provoke L3 policy selection. Layer 2 (L2) beliefs are more imprecise than normal, yet still occasionally become certain enough to trigger L2 policy selection. Layer 1 (L1) beliefs do not have compromised precision, and thus continue to trigger L1 policy selection as they normally would. Notice that L1 actions occur over a shorter temporal horizon and thus have less temporal depth when compared to L3 actions.

²⁵ Here by physical we are generally referring to subtle actions such as saccades of the eyes, subtle shifts in body posture and the like.

An area of potential concern is how the system pursues a sustained meditative policy, entailing repeated mental tension release until the perception of a cessation event, given that high-level attenuation should inhibit the pursuit of such a policy when the level that policy operates at becomes too imprecise. However, the deconstruction process, even over a single session, is not linear. On average, higher-level inference takes place proportionally less and less of the time, yet still intermittently occurs far into the process. This means that the high-level meditative policy (involving what is necessarily to traverse the *jhānas* or the insight knowledges) is revisited, though more infrequently due to progressively less precision on high-level beliefs. Furthermore, the advanced meditator's strongly developed habits of releasing tension mean that the process is likely to be carried out due to, through habitual repetition, the establishment of empirical priors that influence policy selection independently of current expected free energy (see Parr et al., 2022, p. 93). The upshot is an automated tendency to reflexively release mental tension.²⁶ This is particularly crucial in the late stages of deconstruction when higher-level inference is fully offline. The 'forage lower' policy selection is carried through to a cessation event, as we will describe in 6.4., based on this kind of cultivated habitual inertia.

6.3. Equanimity cast as degree of higher-level policy attenuation, affective valence as a marker of hierarchical inference level

We noted that perceiving with more equanimity and less reactivity is perceiving with less fabrication in experience—the degree of equanimity correlates with the degree of defabrication. Having examined the effects of decreasing belief precision on policy selection, we are equipped to discuss equanimity mechanistically.

Equanimity increases as higher-level policy selection is curtailed due to the process described in the previous section. Equanimity reflects the decrease of the probability of higher-level policies being selected, due to reduced higher-level belief precision. It is non-reactivity through high-level policy attenuation. For example, a meditator moving from *third* to *fourth jhāna*, or from *knowledge of arising and passing away* to *dissolution*, increases their equanimity because the inference process is more constrained to lower-level policies which are experientially reflected as less reactivity to phenomena.

The system spending proportionally more time lower in the hierarchy tracks not only with increased equanimity, but also with increased positive affective valence. Recall that more positive affective valence is associated with a reduction in fabrication and mental tensing. Since tensing is reduced as we move hierarchically lower, affective valence observations reflect this, becoming increasingly positive. Beliefs about valence then come to predict these observations, with valence beliefs at one level reflecting improved experience compared with

²⁶ For example, Maha Bua (2012, p73) describes the process where a mediator who has gained proficiency finds their mindfulness and wisdom automatically working in unison without prompting, allowing them to investigate phenomena in successive stages with minimal effort. He goes on to suggest that there is an even deeper level of automaticity at the end point of the practice – supreme-mindfulness and wisdom— where both automatically drill down into everything experienced.

at the level above. Thus both affective valence and equanimity reflect where in the hierarchy inference is currently occurring.

6.4. Illustrative example of full deconstruction

We now illustrate progressive meditative deconstruction over a single meditation session under AIF, moving downward through hierarchical perception and passing through one particular sense modality, visual perception, yet suggest an analogous process for the other sensory modalities. The example here could be read as a case where the meditator starts the session with eyes open. Our illustration starts by reflecting general perceptual trends (with perception understood broadly and including the perception of thoughts) tracking with the insight deconstruction route, and not the *jhānas* until the Substrates of Objecthood section, from where we present both the *samatha* and insight sides of the process.

As discussed in section four, the system (meditator) begins to meditate (selects a meditative policy) according to their chosen defabrication route (insight route roughly followed here), to initiate deconstruction, thus starting in the *insight knowledge of arising and passing away*. Prior to visual deconstruction, the process initially most strongly influences high up in the hierarchy, which has been associated with self-narrative related thinking, with the default-mode network (DMN) implicated, where “a domain-general model of the embodied agent” is instantiated (K. Friston, 2018; K. J. Friston et al., 2017; Carhart-Harris & Friston, 2019). The DMN has been shown to be suppressed under meditation (Zagkas et al., 2023), reflecting attenuation via meditation of these higher levels.

Belief precision concerning self-narrative content, including related thoughts, is reduced by the release of mental tensing, moving experience and the inferential process hierarchically downward, resulting in proportionally less inference on self-narrative beliefs on average over time, as lower-level information seeking is favoured over self-narrative concerned policy selection (reflected experientially as less self-narrative related thoughts arising). This continues until such content is either entirely or largely absent from the mix of phenomenal experience. We suggest that the advanced meditator, by starting in *knowledge of arising and passing away*, is able to more quickly attenuate belief precision at this level than a novice.

The system gradually moves down to inference concerning sensory integration, where the same process occurs with lower-level conceptual beliefs regarding objects, such as conceptual labels for objects (reflected in experience as less high-level conceptual recognition), where the superior temporal sulcus and middle temporal gyrus have been implicated; evidence suggests this region to also be suppressed under meditation (Farb et al., 2010; Beauchamp et al., 2004). Again, reduced belief precision at this level tilts policy selection toward epistemic over pragmatic policy pursuit. Note that progressive belief precision reduction at one level may overlap with the same process at the next, yet on average precision is reduced to a greater degree higher up. The system does not necessarily disengage fully from pragmatic policy selection at one level prior to increasingly disengaging at the level below.

Next, in the visual system, the system proceeds to increasingly deconstruct visual experience, with decreasing precision on beliefs concerning viewpoint-invariant visual objects, with the lateral occipital complex implicated here (Vinberg & Grill-Spector, 2008;

Appelbaum et al., 2006; Grill-Spector et al., 2001; Kourtzi & Kanwisher, 2001). Release of further tensing moves the system lower still, now decreasing precision on view-dependent objects, where the inferotemporal cortex has been implicated (Peissig & Tarr, 2007). This is reflected in experience as a decreasing proportion of content featuring more conceptually complex objects and policies entrained by those conceptual beliefs. At this point any policies underpinned by beliefs about what object the system is perceiving are increasingly less likely to be selected (such as the perception of concepts such as ‘snake’ or ‘rope’ mentioned earlier).

This degree of deconstruction in the meditation session, from the attenuation of those viewpoint invariant and dependent object beliefs, results in increased predominance of lower-level inference, concerning beliefs regarding basic form or shape and lines, such as those instantiated by the early visual cortex, which become increasingly prevalent in experience. Empirical evidence from meditators supports this, with reported increased prominence in experience of aspects such as shape, size, three-dimensional depth and a loss of object boundaries in the visual field (Deikman, 1963; Ataria, 2015) in addition to pixelation, visual snow and flickering (Lindahl et al., 2014). We note that loss of object boundaries is roughly analogous to reports of decreased perception of body boundaries in the *insight knowledge of dissolution*, which is associated with decreased perception of boundaries (cf. Mahasi, p. 21; Folk, 2013, sec. Dukkha Nanas). At this level, the system is increasingly constrained to policies unfolding over very short temporal horizons that involve only mental actions on shape, object boundaries, etc. That is, for the meditator, experience has moved predominantly to the present moment.

With sufficiently reduced precision on visual-cortex linked beliefs, we begin to increasingly enter into levels associated with formless phenomenal experience. That is, experience not clearly attributable to originating from the five external senses or the body. Although object boundaries have already begun to be compromised by this point, that becomes much more extreme as we proceed into increasingly ‘objectless’ states. Where in the cortical hierarchy such processing occurs is unclear, yet the process appears to be beyond the visual system. This increasing (but not yet exclusively) objectless experience corresponds to territory in the *insight knowledge of equanimity*, and if one were deconstructing via the samatha route, would correspond to the fourth jhāna, having traversed the previous three jhānas.

Substrates of objecthood

As the system continues the meditative deconstruction process, with a drastic reduction in higher-level content due to insufficient belief precision, moving experience and inference ever lower, we reach a level where beliefs appear to be concerned with spatial orientation itself. As discussed earlier, the formless jhānas begin with the fifth absorption state, boundless space, exclusively featuring a sense of unbounded spaciousness without form (sensations attributable to the external world or the body) populating that space.

For the insight route at an equivalent hierarchical level (space aspect of knowledge of equanimity emphasised), this manifests phenomenologically as a predominance of spaciousness in relation to other content within experience. We propose that this experiential prevalence of perceptual beliefs regarding space is due to now insufficient precision on beliefs regarding very basic content, which are normally contextualised with such spatial

attributes. The upshot is their partial or full attenuation in experience at such low levels of the hierarchy, leaving the underlying belief that space is the best explanation for current sensory input. As space is perceived without contents within it, policies involving the spatial movement of attention (like a saccade to selectively sample a given area) would appear to no longer be epistemically beneficial since there are no features within experience to be confirmed in spatial relation to others. Beliefs at this level would also appear to correspond to the spatial hyperprior or Kantian primal form of intuition, ‘space’ (Hohwy, 2013, p. 5; Clark, 2013, p. 196, 2016; Swanson, 2016). Space, as a hidden cause or best explanation of the kinds of statistical regularities of input that creatures such as ourselves take in, may be an innate preference of the system and thus genetically imbued, or acquired early in life. Either way, Buddhists have long taken space to be a constructed phenomenon.²⁷

As precision decreases over spatial-representation beliefs, the system moves lower, as noted earlier, to beliefs which appear to represent an unbounded field of consciousness and presence. Such beliefs are experientially reflected, either prominently for the insight route, corresponding to the consciousness or awareness aspect of the knowledge of equanimity, or predominantly for the samatha route, corresponding to the sixth jhāna, boundless consciousness.

Decreasing precision on those beliefs deconstructs even further down, with lower-level sampling seemingly concerning an underlying basis upon which a sense of conscious presence is constituted. Here beliefs exclusively (samatha route with the seventh jhāna, nothingness) or predominantly (insight route, nothingness aspect emphasised in knowledge of equanimity) concern the absence of any kind of presence in experience.

An interpretation of this degree of deconstruction would be that this is hierarchically where beliefs underlying the capacity to conceptually grasp anything at all sit, as moving lower reveals phenomenal experience featuring complete conceptual ineffability. Similarly to above, where there is space without form, here there is absence without the presence of anything. Thus at this level beliefs undergirding an experiential sense of presence appear to predominate. Decreasing belief precision at this level due to further release entrains information resampling at the next level, for the meditator, either the eighth jhāna (neither perception nor non-perception), or with the insight route, the neither perception nor non-perception aspect of knowledge of equanimity. As mentioned above, this level appears to concern beliefs which are reflected phenomenologically as *some experience*, yet in ineffable terms.²⁸ Insufficient precision on these beliefs appears to result in an absence of phenomenal experience, discussed above as a cessation event over a very brief temporal window.

²⁷ For example, see Burbea (2014) where he writes “a sense of the vastness of awareness is still itself an object, a perception, which includes, woven into it, a perception of space. [...] [T]he spectrum of fading reveals that any such perception of space is still fabricated. This appearance of a vastness of awareness is then a fabrication.” (Burbea, 2014, Chapter 25. Emptiness and Awareness) or for a more traditional source see (Bodhi, 2012; AN 9.34).

²⁸ This may be a candidate for what Metzinger (2020) has termed minimal phenomenal experience. That is to say, we hold that the ineffable territory of eighth jhana and the neither perception nor non-perception aspect of the knowledge of equanimity, due to being adjacent to cessation events, makes these the appropriate most minimally constructed experience on offer whilst still being phenomenal experiences and not the absence of such experience. Metzinger (2018) has proposed the Ascending Reticular Activation System may be implicated in such experience.

Thus we propose cessation events are a consequence of insufficient precision on beliefs at even the lowest level of the hierarchy involved in phenomenal experience. In principle, epistemic policy selection, like before, would drive the process lower, yet there is no lower-level inference, at least which is associated with any phenomenal experience at all. A full shutting down (albeit temporarily) of inference at any level associated with phenomenal experience would mean no posterior predictions about the best explanation for current sensory input that have phenomenal consequences. We suggest that a new theoretical-computational construct may be needed in the AIF literature to address this puzzle.

With regard to the neuroscientific understanding of cessation events, we note that Chowdhury et al. (2023) in an EEG study on an advanced meditator found cessation events to be associated with an alpha-power decrease in occipito-parietal areas of the brain. They note that the decrease in alpha power before cessation events are consistent with the hypothesis that such events are the consequence of attenuated hierarchical processing in the brain (p.15) given that alpha power is used as an index of top-down processing and high-level psychological functioning (Klimesch, 2012; Walsh et al., 2020), while Sedley et al. (2016) found alpha-band oscillations relate quantitatively to prediction precision.

The deconstruction process, ending in the absence of phenomenal experience due to a lack of clinging and corresponding mental tensing, suggests that such tensing underwrites experience itself. We have proposed that repeated release of tensing associated with a given hierarchical level of perception decreases the precision of beliefs at that level leading to inference taking place progressively lower down the hierarchy in an attempt to resolve the increased higher-level uncertainty. Insufficient belief precision at a given level either reduces or fully disengages pragmatic policy selection related to conceptual beliefs at that level due to the increased expected free energy of those policies, when compared to policies invoking lower-level information foraging, resulting in experience featuring content reflecting lower-level inference processes, with the system overall featuring shallower temporal depth. Sufficiently reducing belief precision at the hierarchically lowest level associated with phenomena experience appears to result in the absence of any posterior predictions regarding the best explanation for current sensory input if we take the link between posterior beliefs and phenomenal experience to be the case.

	Samatha jhāna	Insight knowledge	Beliefs (Predictions regarding...)	Plausible neurophysiological brain region implicated	
More craving More mental tensing Less equanimity More negative valence	Not described in terms of samatha jhāna states.	Progressing from knowledge of arising and passing away to knowledge of equanimity.	self-related	default-mode network	More conceptual complexity & abstraction Long timescale phenomena
	States progressively decrease in conceptual complexity of abstraction of phenomenal experience.	States progressively decrease in conceptual complexity of abstraction of phenomenal experience.	viewpoint-invariant semantic understanding	lateral occipital complex	
			viewpoint-invariant visual objects; viewpoint-dependent visual objects	inferotemporal cortex	
			constituent parts of objects, i.e. edges, lines and shape	early visual cortex	
Less craving Less mental tensing More equanimity More positive valence	fifth jhāna: boundless space	space aspect of knowledge of equanimity	spatial representation	to be investigated	Less conceptual complexity & abstraction Shorter timescale phenomena
	sixth jhāna: boundless consciousness	consciousness aspect of knowledge of equanimity	basic reflexive awareness	to be investigated	
	seventh jhāna: nothingness	nothingness aspect of knowledge of equanimity	basic substrate of objecthood	to be investigated	
	eighth jhāna: neither perception nor non-perception	neither perception nor non-perception aspect of knowledge of equanimity	predictions regarding minimal phenomenal experience	ascending reticular activation system proposed by Metzinger (2018)	
No craving or mental tensing	cessation event	cessation event	no predictions about sensory input	alpha rhythm decrease in occipito-parietal areas	No phenomenal experience

Fig. 5 Full meditative deconstruction under AIF

Samatha jhana (first column) and insight knowledge (second column) routes as presented in illustrative example (section 6.4), with associated beliefs (third column) attenuated via insufficient precision at that level, and corresponding reduced activity in plausibly implicated brain regions (fourth column). On the left: craving and mental tensing decrease as deconstruction advances, with equanimity and positive affective valence increasing (left arrows). On the right: trends in conceptual belief complexity and duration of experiential phenomena (right arrows), ending in the absence of phenomenal experience with the cessation event (bottom row of table and rounded arrows).

7. Discussion

We have developed a novel account of deep meditative deconstruction in terms of Buddhist defabrication under the active inference framework. We attempted to render Buddhist defabrication tractable under the framework by taking a contemporary Buddhist phenomenological approach. By constraining our examination to defabrication by an advanced meditator over a short temporal horizon, taking pre-existing meditative skill as a given, we were able to identify the release of mental tensing as a correlate of reduced craving. This set the stage for our proposal casting the reduction in mental tensing as a level-specific reduction in belief precision. We showed how the release of tensing, due expected free energy being scored in terms of both epistemic and pragmatic value, drives the system to lower-level inference in pursuit of epistemic value. We illustrated how, when repeated ever-lower in the hierarchy, this results in a downward cascade of inference to progressively lower levels that feature decreased construction, abstraction and conceptual complexity, and that the meditator's phenomenal experience reflects this. We then showed that, as an upshot, both increased equanimity and more positive affective valence correlate with this downward hierarchical traversal, helping to illuminate the meditative experience by way of AIF.

In our illustrative example we aimed to render our account more concrete. This revealed the foundational role that low-level beliefs, and their specific hierarchical ordering, may play in serving as a substrate for higher-level beliefs about objecthood. This may serve to inform our understanding of the kind of core knowledge enabling higher-level comprehension. We furthermore examined the nature of cessation events in relation to hierarchical processing, finding them to be momentary yet complete disruptions in perceptual processing as it pertains to phenomenal experience, occurring when even the lowest-level beliefs lack sufficient precision to yield lived experience.

This work has attempted to weave together Buddhist understanding, phenomenology and AIF computational mechanistic descriptions. Recognising that this represents merely a first step of such a project, we note a couple limitations and several avenues for future research. One limitation is the amount of phenomenological support attesting to an advanced meditator's experience. While our approach has employed descriptions from a variety of advanced meditators, future research would benefit from taking a far more rigorous approach to the phenomenology involved in deconstruction, by employing micro-phenomenological interviews (Bitbol & Petitmengin, 2017) detailing the experienced perceptual changes in more depth. Another limitation is the loose mapping between the earlier samatha jhānas, insight knowledges and the levels of beliefs attenuated in our illustrative example. We have outlined this relationship in broad strokes, however, a tighter mapping of the relationships, in our view, requires a substantially more in-depth treatment due to its complexity than we are able to offer here, leaving this for future work. Another avenue for future research involves developing a formal computational model of meditative deconstruction under AIF, formalising and computationally demonstrating the dynamics of the process. A third avenue would be how the deconstruction process impacts the sense of self and identification. These are challenging areas to explain which merit serious attention, yet for now we will only say that we hope that this work lays a foundation for such endeavours. Finally, there is much more to understand in terms of detailed mechanistic explanation—beyond existing work—of how meditators engaging in Buddhist practices come to achieve the capacity to deconstruct experience. A capacity we have taken for granted in this paper.

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