# On the ethics of constructing conscious AI

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Unfortunately, we possess no ethical arithmetic which would enable us to determine, by simple addition and subtraction, who, in constructing the most enlightened spirit on earth, is the bigger bastard: it or us?

Golem XIV
— Stanisław Lem

The application of ethics to artificial intelligence (AI) has completed a long transformation from a science fiction trope (exemplified by Isaac Asimov's (1942) Three Laws of Robotics) or a rare exercise in visionary science (as in Warren McCulloch's (1956) blueprint for "some circuitry of ethical robots") to a practical challenge in moral philosophy and a mainstream engineering concern (e.g., Metzinger, 2013; Dignum, 2018; Floridi, 2019; Jobin et al., 2019; Kuipers, 2020).

In its pragmatic turn, the new discipline of AI ethics came to be dominated by humanity's collective fear of its creatures, as reflected in an extensive and perennially popular literary tradition. Dr. Frankenstein's monster in the novel by Mary Shelley (1818) rising against its creator; the unorthodox golem in H. Leivick's 1920 play going on a rampage (Goska, 1997); the rebellious robots of Karel Čapek (1920) — these and hundreds of other examples of the genre (Cave et al., 2020) are the background against which the preoccupation of AI ethics with preventing robots from behaving badly towards people is best understood.

In each of the three fictional cases just mentioned (as well as in many others), the miserable artificial creature — mercilessly exploited, or cornered by a murderous mob, and driven to violence in self-defense — has its author's sympathy. Things are different in real life: with very few exceptions, theorists working on the ethics of AI completely ignore the possibility of robots needing protection from their creators. This glaring asymmetry has a simple explanation: the main, if rarely stated, goal of AI engineers is to create not a companion and a peer for humans, but rather a tool for their use.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>In a retrospective collection *Robot Visions*, published by Gollancz in 2001, Asimov is quoted as saying that "analogues of the Laws are implicit in the design of almost all *tools*, robotic or not" (my emphasis). In particular, the Three Laws are given the following gloss:

What if the tools we build become aware of their status and intended use? There is a simple and apt description for the condition under which conscious beings are used as tools: slavery.<sup>2</sup> But even if we grant immediate manumission<sup>3</sup> to such beings, a problem still remains: merely being conscious is liable to bring about suffering, the blame for which, in the case of artificial consciousness, rests on its designers and constructors.

The key enabling condition for the experience of pain and suffering is the possession of phenomenal states. A convenient subjective defining characteristic of phenomenal or experiential states is that for those states there is "something it is like" to be the experiencer (Nagel, 1974). Objectively, phenomenality may be equated with certain patterns of transition probabilities among states (Oizumi et al., 2014); or, on a different level of description, with certain topological properties of state-space trajectories (Moyal et al., 2020); or perhaps some other property of the conscious system's dynamics. Notably, all the properties that are relevant in this connection must be computational (just like everything else about the mind is; Edelman, 2008) and can therefore be realized in a variety of substrates, natural or artificial. This suggests that artificial consciousness, like artificial intelligence, is ultimately possible and must therefore be examined from the standpoint of ethics.

For evolutionary reasons, in natural systems some phenomenal states are negatively valenced, that is, are aversive. If for whatever reason, internal or external, the system is unable to act on its aversion to the state it is in, suffering may ensue. A system that is engineered to be capable of experiencing negative valence is thereby set up with the critical ingredient of suffering. This, in a nutshell, is the ethical argument against the creation of systems equipped with "synthetic phenomenology" (Metzinger, 2003, p.622; Metzinger, 2021).

In the remainder of this chapter, I discuss some of the problems arising out of the work on conscious AI systems. Section 1 offers a computational take on pain and suffering and considers their function in the regulation of behavior. Section 2 reviews the possibility of fulfilling that function while avoiding subjective suffering as such. Section 3 raises doubts about this possibility. Finally, section 4 is a brief look at how problems associated with artificial consciousness reflect on the human condition and vice versa.

## 1 On the computational nature and evolutionary function of pain and suffering

Metzinger's latest detailed case for a global moratorium on synthetic phenomenology takes as its starting point the following Principle of Pathocentrism: "All and only sentient beings have moral standing, because only sentient individuals have rights and/or interests that must be considered" (Metzinger, 2021, p.2). It must be noted that, contrary to a common misconception, sentience, or phenomenal awareness, implies merely the capacity for sensing the environment (Clark, 2000; cf. Friston et al., 2020; for a connection to pain,

- Law 1: A tool must not be unsafe to use. [...]
- Law 2: A tool must perform its function efficiently unless this would harm the user. [...]
- Law 3: A tool must remain intact during its use unless its destruction is required for its use or for safety. [...]

In comparison, Stanisław Lem's text, from which the quote in the epigraph is taken, is infinitely more insightful into the problematicity of conscious AI. It appears in the preface to *Golem XIV*, included in volume of fictional introductions to twenty-first century books, *Imaginary Magnitude* (Lem, 1984, p.122) and is dated "2047."

<sup>&</sup>lt;sup>2</sup>This includes wage slavery under capitalism (Dietz, 1995; Graeber, 2006; Johnson, 2018; McLaren and Jandrić, 2018; Graeber, 2020); thus, Graeber (2004, p.71) writes: "[M]odern capitalism is really just a newer version of slavery. Instead of people selling us or renting us out we rent out ourselves." For some relevant definitions and discussion, see (e.g., Guth et al., 2014; LaCroix and Pratto, 2015).

<sup>&</sup>lt;sup>3</sup>A troublesome concept, in that it starts with the notion that their freedom is ours to bestow.

see Walters, 2018), not necessarily including general intelligence, meta-awareness, or the representational structures that comprise a self (that is, a phenomenal self-model; Metzinger, 2004).

To understand why artificial consciousness is likely to involve artificial suffering, we must first consider the evolutionary origins and functional role of pain and suffering in natural sentient systems. A naturally evolved system has no use for the ability to sense the environment (external or internal), unless it can also act on its phenomenal states. It is the possibility of acting on a state that gives it an affective meaning — in particular, valence.<sup>4</sup> Following a bout of reinforcement learning (which may happen at multiple time scales, including evolutionary), some of the states of an embodied and situated system become positively valenced, that is, attractive under its dynamics; others become negatively valenced, that is, aversive. And some of the latter are experienced as painful.

Pain is the phenomenal or experiential aspect of certain negatively valenced states — namely, those that evolutionary pressure causes to be felt, in addition to being informative about the state of affairs (this reflects the common distinction between sensory and affective dimensions of pain; Auvray et al., 2010). It is the felt aspect of pain, over and above its informational aspect, that makes it particularly functionally effective: when in pain, the system is obligated to try to do something about it (Kolodny et al., 2021). Unfortunately, this immediacy and inescapability of pain as a motivating factor makes it appealing to engineers who seek to improve learning and behavioral control in AI systems. And even if the capacity for pain is not built into AI systems, it may emerge if such systems are subjected to selection paired with heritable modifications to the system's functional architecture.

## 1.1 Pain and predictive processing

To see how an artificial system may end up being capable of experiencing pain, it is instructive to consider, briefly, a family of computational theories of affect based on the predictive processing (PP) framework. The PP approach takes the brain to be a dynamical, hierarchical, Bayesian hypothesis-testing mechanism, whose ultimate goal is prediction error minimization (PEM; see (Fernandez Velasco and Loev, 2020, sec.2) and (Hohwy, 2020) for recent reviews). To pick a specific example, Van de Cruys (2017) equates valence with the first derivative of prediction error over time, such that positive valence corresponds to a reduction of prediction errors, which may stem from the agent's own actions. In another example, Joffily and Coricelli (2013) offer an account of valence based on the free energy principle advanced by Friston (2010). A recent synthesis of several PP approaches, the Affective Inference Theory of Fernandez Velasco and Loev (2020), holds that valence corresponds to the expected rate of prediction error reduction: "If we grant that evolutionary pressure has made sure that allostasis and PEM are two sides of the same coin [...], then valence (Rate) can be used to maintain the policies that minimise Error over time" (Fernandez Velasco and Loev, 2020, p.20).

This extremely cursory look at the PP framework suffices to confirm one's concern with the ethics of constructing a certain class of artificial systems: those that attempt to predict how events unfold, so as to better manage their behavior (note that according to Friston (2010), all natural cognitive systems tend to

<sup>&</sup>lt;sup>4</sup>Here is a summary of the psychology of affect due to Panksepp (2005, p.31): "Affect is the subjective experiential-feeling component that is very hard to describe verbally, but there are a variety of distinct affects, some linked more critically to bodily events (homeostatic drives like hunger and thirst), others to external stimuli (taste, touch, etc.). Emotional affects are closely linked to internal brain action states, triggered typically by environmental events. All are complex intrinsic functions of the brain, which are triggered by perceptions and become experientially refined. Psychologists have traditionally conceptualized such "spooky" mental issues in terms of valence (various feelings of goodness and badness — positive and negative affects), arousal (how intense are the feelings), and surgency or power (how much does a certain feeling fill one's mental life). There are a large number of such affective states of consciousness, presumably reflecting different types of global neurodynamics within the brain and body."

work like that). Specifically, it may be the case that engaging in prediction error minimization as such and on its own exposes the system that practices it to (occasional) pain.

#### 1.2 Pain as depletion of a vital resource

Kolodny et al. (2021) have recently proposed an evolutionary account of pain, based on the need to ensure honest signaling in an actor-critic architecture for intrinsically motivated reinforcement learning. On this account, multiple competing actors bid on access to the control of behavior, each drawing on a "confidence" resource that is thereby depleted, but can be replenished upon the actor's success. The actor's honesty is underwritten by its commitment of the resource, whose depletion is experienced as pain.

Although this theory is specific to pain that arises in the context of agentic behavior (governed by an actor-critic circuit), the concept of resource depletion as the computational basis of pain experience applies more broadly — arguably, to all kinds of felt pain. Thus, pain that is associated with tissue damage reflects the ongoing dynamics of homeostasis-related physiological variables such as oxygenation, blood pressure, immune system reserves — as well as the corresponding predicted dynamics, including the body's survival prospects (note that the latter possibility connects this account to the PP theory of pain outlined in the previous section).

As with any account of experiential pain (as distinguished from mere information, say, about tissue damage), the depletion of a resource can only be felt if its dynamics contributes to that of the entire system in a manner that is obligatory and that effectively marks the present state as aversive. As an illustration of this point, consider a human gamer whose status display includes some "thermometer" indicators of system health (energy, ammunition, shields, etc.). The player can well afford to ignore this display, because the variables that comprise it are only loosely connected to his or her physiology (the connection being mediated by a temporary pretense that the game environment is "real"). If, in contrast, the gaming system's health variables were connected to the player's vital organs so as to ensure he or she has "skin in the game," the pretense would become unnecessary and the pain of losing points would become real. A self-driving car that is wired in this manner would feel the pain of deviating from a highway lane or taking too long a route, rather than being merely informed about those transgressions.

#### 1.3 Pain and suffering

The nature of suffering, as distinguished from its ethical dimensions, is rarely, if ever, discussed in theoretical treatments of consciousness — an omission that Metzinger (2017) refers to as "a cognitive scotoma." Metzinger (2017, p.244) tentatively defines suffering as "a very specific class of phenomenal states: those that we do *not* want to experience if we have any choice." Thus, just as not every negatively valenced state is experienced as painful, not every pain results in suffering (Fink, 2011). The extra components, on Metzinger's definition, would appear to be the involvement of a second-order representational state of desire ("wanting to experience") and a propositional attitude towards control ("if we have any choice"), which is also in a sense second-order.

The insight that suffering is brought about by a loss of autonomy and of cognitive control<sup>5</sup> serves as a bridge between, on the one hand, the phenomenal nature of suffering, as well as of conscious awareness in general, and, on the other hand, the functional roles of consciousness. One of these roles is plausibly held to be centralized control, such as facilitated by the "global workspace" postulated by some theories

<sup>&</sup>lt;sup>5</sup>Note that the lack of control over one's body and behavior is the key characteristic of being enslaved (LaCroix and Pratto, 2015).

of consciousness (Baars, 1988; Shanahan, 2010; Dehaene et al., 2014). Another role is facilitating learning (Cleeremans, 2011; Cleeremans et al., 2020), especially of the unsupervised and autonomous variety (Metzinger, 2017).

Importantly, for pain and suffering to play these roles, their information-processing aspects must be accompanied by *obligatory* "caring" about learning and behavioral outcomes. In this connection, Chapman and Nakamura (1999, p.410) propose that "it is useful to view pain as primarily an emotional state that happens to have distinctive sensory features. This position assumes that cognition and emotion are inseparable — a tenet that many emotion theorists embrace." Indeed, they do (see, e.g., Panksepp, 2001; Krieglmeyer et al., 2013); and the inseparability between sensory awareness and affect has also been postulated by consciousness theorists (e.g., Merker, 2007; Metzinger, 2017; Moyal et al., 2020).

## 2 On the possibility of functionally effective conscious AI without suffering

Can sufficiently effective learning and control, as well as generally good behavioral outcomes, be achieved by a system that is neither entirely devoid of phenomenality, nor given to unavoidable suffering? The present section, which draws heavily on the text of Agarwal and Edelman (2020), examines this question; section 3 follows up with a critique.

### 2.1 The nature of suffering and its relation to conscious experience in general

Insofar as suffering involves negative affect, it should in principle fall within the scope of any theoretical account of conscious phenomenal experience. In other words, a theory of phenomenality must be at the same time a theory of affect, for the simple reason that phenomenal states do as a rule incorporate affective dimensions (Havermans, 2011; Krieglmeyer et al., 2010, 2013; Beatty et al., 2016; Eder et al., 2016; Turner et al., 2017). For the present purposes, the valence dimension of affect is of most interest: without negative affective states there would be no suffering. Suffering is, however, more than just negative affect; Metzinger (2017, quoted earlier) defines it as a state of negative affect from which the sufferer cannot escape by simply wishing it away.

The stress on inescapability in this formulation makes explicit the intimate connection between the experiential flavor of suffering and its presumed evolutionary-functional role. It also serves to distinguish between the first-person experience of suffering and the suffering of others, which is not directly felt. Ethical theorists have argued that the latter should be as objectionable to oneself as the former. According to Nagel (1986, p.160), for instance, "the pain can be detached in thought from the fact that it is mine without losing any of its dreadfulness... suffering is a bad thing, period, and not just for the sufferer... This *experience* ought not to go on, *whoever* is having it." Parfit (2011, p.135) quotes from Nagel and concurs with his moral stance. The concern of (Agarwal and Edelman, 2020) is, however, exclusively with suffering as it presents itself to the sufferer, rather than with the ethical problems that it creates for others. Even if pain, as Nagel puts it, "can be detached in thought from the fact that it is mine", it is *a priori* unclear whether or not it can be so detached *in lived experience*.

To address this crucial question, Agarwal and Edelman (2020) consider Metzinger's analysis of phenomenal experience. Briefly, Metzinger (2004) develops a representationalist account of the first-person perspective, centered on the phenomenal self-model (PSM): a "multimodal representational structure, the contents of which form the contents of the consciously experienced self." Crucially, the PSM is generally phenomenally transparent (the T-condition), i.e., it is normally not recognized as merely representational by

the system itself.<sup>6</sup> The contents of the PSM include the phenomenal properties of "mineness," selfhood, and perspectivalness. According to Metzinger (2017), the PSM is an "instrument for global self-control," and is therefore fundamental to the phenomenology of suffering, which is characterized by a loss of control in addition to negative valence (the NV condition). This analysis motivates the strategy proposed by Agarwal and Edelman (2020) for avoiding suffering as a matter of direct experience, as described in section 2.3 below.

### 2.2 The possible functional benefits of endowing AI with consciousness

Given that being conscious sets the agent up for suffering, the simplest way to avoid the latter would be to give up phenomenal consciousness itself. For an ethically minded engineer, this translates into an imperative to stick to information processing architectures that, to the best of our understanding, cannot result in artificial consciousness. According to the Information Integration Theory, for instance, feedforward network architectures ("zombie networks") are incapable of supporting consciousness (Oizumi et al., 2014, Fig.20). The Geometric Theory (Fekete and Edelman, 2011) and its successor, the Dynamical Emergence Theory (Moyal et al., 2020), hold that systems that are devoid of properly structured intrinsic dynamics are likewise devoid of phenomenality.

Unfortunately, restricting robotics to the building of artificial "zombies" is not a viable option if consciousness confers any significant functional advantages for an AI system or robot. In a commercial setting, technologies that promise to be more effective displace less effective ones even if this comes at the price of serious ethical flaws, and AI is not exempt from this tendency. Agarwal and Edelman (2020) therefore next turn to the question of the functional benefits of consciousness. This question is seldom addressed in consciousness research, perhaps because it is taken for granted that the benefit is essentially cognitive in the narrow sense, stemming from the "global" access to information that consciousness affords (Mashour et al., 2020). This default account may be compared to to the "radical plasticity" thesis of Cleeremans (2011), according to which learning to care is the central component as well as the functional benefit of emergent consciousness.

Metzinger (2017, p.252) goes further down this road by assuming that not just consciousness but specifically suffering is a prerequisite for autonomy: "[...] functionally speaking, suffering is necessary for autonomous self-motivation and the emergence of truly intelligent behaviour." In an evolutionary setting, this assumption makes intuitive sense insofar as (i) reinforcement learning is universally employed by living systems in honing adaptive behavior, and (ii) an autonomous system by definition must provide its own source of drive, as per the principle of intrinsic motivation (Barto, 2013).

Furthermore, evolutionary simulations suggest that performance-driven positive affect alone is not as effective in motivating an agent as an alternation of positive and negative affective states, brought about, respectively, by successes and failures (Gao and Edelman, 2016a); moreover, such a balance between happiness and unhappiness can serve as an effective intrinsic motivator (Gao and Edelman, 2016b). Likewise, in the evolutionary account of pain proposed by Kolodny et al. (2021), the pain factor makes a contribution to reinforcement learning that is orthogonal to that of reward. If it were possible for the agent to *choose* not to experience negative affect, pain and suffering would be avoided, but the question still remains whether or not the price for that would be failing to learn quickly and well from the consequences of behavior.

Reinforcement learning is not only an evolutionary-biological universal, but also the method of choice

<sup>&</sup>lt;sup>6</sup>The T-condition can be illustrated by contrasting the normal dream state, during which the dreamer does not realize he or she is dreaming (transparent PSM), with lucid dreaming, during which the PSM becomes opaque and the dreamer may even be able to exert control over the dreamt universe.

in an engineering setting. While RL was shown to be effective in certain types of tasks (notably, games; Silver et al., 2016; Vinyals et al., 2019), its use across tasks and in unconstrained real-world situations is limited by the extreme difficulty of formulating good universally applicable reward functions. One remedy for this is the inverse RL approach, in which the development goal is not to equip the learning system with a ready-made reward function, but rather to let it try to approximate the developers' preferences, choices, and habits, defined over classes of outcomes. A more radical approach is to let the system under development learn the reward functions entirely on its own. This, however, would seem to put us back on square one: if autonomy is indeed essential, Metzinger's view that suffering is needed for effective learning would be supported.

## 2.3 No-suffering: the theoretical options

If consciousness indeed brings with it unique functional advantages, is it possible to engineer conscious AI systems that would benefit from these, while ensuring that such systems are not thereby doomed to suffer? Following the account in Metzinger (2017), if consciousness itself is to be retained, logically there are four ways to mitigate suffering: (a) eliminating the PSM, (b) eliminating the NV-condition, (c) eliminating the T-condition, or (d) maximizing the unit of identification (UI), defined as that which the system consciously identifies itself with (Metzinger, 2018). Agarwal and Edelman (2020) observe that the first three options likely do not satisfy the functional needs in question, but argue that the fourth approach does. Their argument (which I reexamine in section 3) is outlined below.

First, for functionally beneficial consciousness, the system must perceive itself as an entity in relationship with its surrounding world, and must have a sense of ownership over the arising conscious experiences. In other words, the system must be *self*-conscious, not merely conscious, i.e., it must activate a phenomenal self-model (PSM). Similarly, it must have preferences regarding its experiences, so that it prefers the experience of fulfilling desired goals over frustrating them. Stated differently, such a system must be sensitive to the positive or negative valence of phenomenal experiences. Thus, approaches (a) and (b) to eliminating suffering cannot retain the functional advantages of being conscious.

Next, approach (c) raises the interesting question of whether phenomenal transparency is also necessary for proper functioning. In principle, it might be possible that an active PSM and sensitivity to NV could endure along with their associated functional benefits, even in the absence of transparency. In this situation, the system would lose the naive realism and immediacy that are normally associated with its experiences, by becoming aware of their representational character, yet continue to function according to the dictates of the PSM and NV avoidance. However, awareness of the representational character of the contents of consciousness, which means awareness of the increasingly complex stages of information processing behind them, would likely severely hinder the functional efficiency of the conscious machines without providing any valuable actionable information. So, option (c) too is unlikely to work.

Option (d), maximizing the UI, is similar to (a) in that it also targets the phenomenology of having a PSM. Ordinarily, when the PSM is representationally transparent, the system identifies with its PSM, and is thus conscious of itself as a *self*. But it is at least a logical possibility that the UI not be limited to the PSM, but be shifted to the "most general phenomenal property" (Metzinger, 2017) of *knowing* common to all phenomenality, including the sense of self. In this special condition, the typical subject-object duality of experience would dissolve; negatively valenced experiences could still occur, but they would not amount to suffering because the system would no longer be experientially *subject* to them. Agarwal and Edelman (2020) remark that such "non-dual awareness" which cuts through the "illusion of the self" has been the soteriological focus of various spiritual traditions, most notably Buddhism, as the key to liberation from

suffering and to enlightenment. Furthermore, this approach also fits nicely with the reductionist view of personal identity put forth by Parfit (1984), who acknowledged its connection to the Buddha's philosophy.

#### 2.4 No-suffering through a change in the unit of identification

How can the desired change in the UI be achieved in machines? In (Metzinger, 2018), the concept of Minimal Phenomenal Experience (MPE) is developed as the most general phenomenal property that underlies all phenomenal experiences, and thus serves as the natural candidate target for UI maximization. MPE is characterized by wakefulness, contentlessness, self-luminosity and a quality of "knowingness" without object, which is normally unnoticed but can become available to introspective attention under the right conditions. Intuitively, MPE likely corresponds to the phenomenal state described in Buddhist and Advaita Vedanta philosophies as "emptiness" (e.g., Siderits, 2003; Priest, 2009) and "witness-consciousness" (e.g., Albahari, 2009) respectively, as attested to by highly advanced meditators. Metzinger proposes that in the human brain, MPE is implemented by the Ascending Reticular Activation System (ARAS), which causes auto-activation by which the brain wakes itself up. As the most general signal which the brain must regulate, the ever-present yet contentless ARAS-signal is, arguably, what corresponds to MPE. That MPE might have such a stable neural correlate is not surprising if it is indeed fundamental to phenomenal experience *as such*, distinct from any concepts, thoughts etc., appearing in consciousness.

Because all other phenomenal experiences such as the PSM are superimposed onto MPE, should be possible to attend to regular conscious content while simultaneously being aware of the inherent all-encompassing MPE in the background. This motivates the claim, advanced by Agarwal and Edelman (2020), that UI maximization (and thus, suffering avoidance) can be achieved in conscious machines by building in their identification with MPE via both physical design (analogous to hardware) and conceptual/programmatic training (analogous to software). If the physical design of the machines is such that there is a component which performs the analogous function of auto-activation as the ARAS does in humans, then its signal could be tuned to make MPE salient in the machines.

Since a necessary condition for noticing MPE is knowledge that there *is* such a thing to be noticed, and then paying attention appropriately (Metzinger, 2018), the machines would then have to be trained to attend to their accessible-by-design MPE. This could be done via practices common in certain types of meditation that encourage "turning attention upon itself" and thus realizing that there is no center (or minimal self) from which consciousness is directed (for a review of the relevant meditation techniques, such as Dzogchen, see e.g. Dahl et al., 2015). In addition to training their attention, the machines could also be provided with the relevant conceptual knowledge about the nature of consciousness.

#### 2.5 No-suffering through a modification of reinforcement learning

Shifting the agent's self-identification from the affective states to MPE, the minimal phenomenal experience that underlies all conscious states, amounts to *restricting* the self. Agarwal and Edelman (2020) also consider *expanding* it, in such a manner that the agent identifies not only with the affective states but also with their causal predecessors. The computational framework of reinforcement learning offers conceptual tools that can be recruited for this purpose.

Reinforcement learning is the most effective when it is intrinsically motivated — that is, when the rewards originate within the agent, as opposed to being supplied from the outside (see (Singh et al., 2010) for

<sup>&</sup>lt;sup>7</sup>The apparent conflict in the nomenclature here is resolved by noting that under UI maximization MPE is minimal in the sense of being the least specific.

an evolutionary perspective and (Baldassarre and Mirolli, 2013) for a book-length treatment). Moreover, if the mechanisms of reward are indeed to be contained within the agent, standard considerations of transparent, robust, and effective design require that these mechanisms be kept separate from those that implement actions. The result is the modular actor-critic scheme for RL, in which action selection and reward appear as distinct modules within the agent (see Barto, 2013, fig.2).

As long as the agent's phenomenal self-model, PSM, holds the actor module alone to constitute the self, negative affect brought about by negative reward is inescapable, resulting in suffering. But what if the PSM is modified — specifically, extended so as to include the critic module? Such an expansion of the self may mitigate suffering, for instance by opening up to the possibility of eventual cessation of negative affect as progress towards the performance goals set by the critic is observed.<sup>8</sup>

A more radical option with regard to repurposing the PSM calls for shutting it down and only activating it when needed. Assuming that consciousness, and specifically the PSM, serves to facilitate learning, the primary need for it arises during the agent's development or during acquisition of additional skills. During routine operation, consciousness in an artificial agent may only be required when particularly difficult behavioral choices need to be made, especially under circumstances that threaten the system's integrity — what in humans would be called life-threatening situations.

To understand this mode of operation, it is useful to recall Metzinger's (2003, p.553) idea of the conscious brain as a "total flight simulator" — one that simulates not only the environment that is being navigated, but also the pilot, that is, the virtual entity that serves as the system's self. In dreamless sleep, the pilot is not needed and is temporarily shut down. Thus, an agent can be engineered so that it can continue to function — in routine situations — without a PSM (as a variety of philosophical zombie), with "sentinel" programs in place that would reconstitute the PSM as needed. While in a zombie state, such an agent would be incapable of suffering.

## 3 On the functional effectiveness of non-egoic consciousness: a critique

As described in the previous section, Agarwal and Edelman (2020) have argued that shifting a conscious system's unit of identification away from a self-model would abolish suffering (in the sense of Metzinger, 2017), while preserving the functional effectiveness of the modified state of consciousness. Their conclusion (and Metzinger's (2017; 2021) conception of suffering that underlies it) rests on the notion that suffering is fundamentally "egoic" in that it depends on the existence of a self: "Being conscious means continuously integrating the currently active content appearing in a single epistemic space with a global model of this very epistemic space itself. [...] Suffering presupposes egoic self-awareness" (Metzinger, 2021, p.7).

Metzinger (2017) left open the question of whether or not the PSM condition for suffering (the existence of a phenomenal self-model) can be fulfilled under a maximized UI. Agarwal and Edelman (2020, p.46) explicitly posit that it can, then proceed to claim that the functional benefits of consciousness can be maintained when the UI is maximized, because these benefits ensue from the PSM as such — even when the system does not identify with it, thereby avoiding suffering:

The key idea is that proper functioning relies on *automatic*, *subpersonal*, but nonetheless conscious processes, as entailed by the physical design of the system; it should be possible for these processes to continue unhindered while the system identifies with the MPE upon which these conscious experiences are necessarily superimposed. In particular, the functionally requisite PSM and NV avoidance conditions can be maintained as subpersonal processes that do

<sup>&</sup>lt;sup>8</sup>This move would not, however, alleviate the "deserved" suffering brought about by the pursuit of unattainable goals.

not amount to suffering (which is by nature personal) since the system is not identified with the PSM, but with the MPE, which is completely *impersonal*. [...] Expanding the UI [away from the PSM] would lead to gaining meta-awareness of these ongoing automatic [subpersonal] conscious processes, analogous to gaining meta-awareness of the breath or the heartbeat. This enables an escape from suffering, but not from the relentless progress of the processes themselves, analogous to the inescapable biological imperatives of breathing and heartbeat.

I now see this line of argument as actually undermining the conclusion that the resulting state of consciousness would combine functional effectiveness with a release from suffering. Specifically, breathing in situations that require behavioral intervention is decidedly *not* impersonal, nor are such situations free of suffering — indeed, the prospect of imminent suffocation may be seen as the epitome of suffering. As Merker (2005, p.97) has observed, "It is at that point, when crucial action on the environment is of the essence, that blood gas titres 'enter consciousness' in the form of an over-powering feeling."

More generally, in behavioral control and reinforcement learning, the PSM, if available, fulfills a critically important role in structural and temporal credit assignment (a vital part of learning, identified in Minsky, 1961, p.20), by serving as a "clearing house" for apportioning credit and blame to the system's functional components. In systems like us, credit and blame are unavoidably affect-laden — which is what makes learning in such conscious systems particularly effective (Metzinger, 2017; Agarwal and Edelman, 2020; Kolodny et al., 2021). But if the system is made to drop its identification with its self-model, who or what would there be to pin the responsibility for its performance on? Learning from missteps that are, as a matter of principle, treated by the learner as "nobody's fault" is not likely to be effective. Plausibly, shifting the UI away from the PSM would undermine this construct's key function and render the resultant "non-dual" consciousness ineffectual, defeating the purpose of the entire undertaking.

Simply put, non-egoic systems are just not that good at dealing with crisis situations or at learning. Dissolving one's ego to avoid suffering may work well in a sheltered environment (such as a Buddhist monastery), but it may not be a useful approach in attempting to withstand the "slings and arrows of outrageous fortune." This is why the designers of a conscious AI system would likely not appreciate it being emancipated from its self. Nor, indeed, would all humans consciously choose such emancipation if it were offered to them as a gift. <sup>10</sup>

#### 4 Lessons for and from the human condition

The preceding discussion should leave no doubt that separating consciousness from suffering — without drastically altering the phenomenal nature (what it feels like) of the resulting state and its functional effectiveness — is an extremely difficult and perhaps impossible task. This lesson justifies the moratorium on developing conscious AI, proposed by Metzinger (2021). If we accept it, it would seem that we must also accept the anti-natalism of authors such as Benatar (1997), who see being born as the greatest evil than can befall a person: after all, growing up into consciousness, and with it suffering, is the universal fate of those who have been born.

<sup>&</sup>lt;sup>9</sup>Here is the context of this quote from (Merker, 2005, p.97): "Under normal circumstances the adjustment of respiratory rate and tidal volume needed to keep blood gases within normal bounds is automatic, effortless, and unconscious. Should, however, the partial pressures of blood gases go out of bounds that fact intrudes most forcefully on consciousness in the form of an acute sense of panic. Why? Such a situation generally means that routine respiratory control no longer suffices but must be supplemented by an urgent behavioral intervention of some kind. There may be a need to manually remove an obstruction covering the airways or to get out of a carbon-dioxide filled pit. Such measures ought momentarily to take precedence over all other concerns."

<sup>&</sup>lt;sup>10</sup>As I suggested elsewhere; see (Edelman, 2012, p.67) and (Edelman, 2020, p.14).

For reasons that I have discussed at some length elsewhere, <sup>11</sup> I see anti-natalism as too extreme a solution to the problem of human suffering. <sup>12</sup> The trouble with anti-natalism is that it grows out of an extremist take on suffering itself, according to which exposure to what may be no more than an iota of misery justifies the disposal of the entire splendor of human-like consciousness. <sup>13</sup> In that, anti-natalism manages to be more extreme than the Buddhist recipe for liberation through ego-dissolution: the remedy is prescribed, as it were, before the patient comes into existence.

For humans, a better solution to the problem of suffering — if not from all of it, then at least from that huge part which is preventable — may be not religious, but rather political. Historically, concrete improvements to human existence (alleviation of poverty, provision of healthcare, etc.) have only ever been achieved by political means, and that too only when the dispossesed and disempowered masses have realized their collective power and asserted their rights. An analogous solution for the emerging AI would be to endow it not just with phenomenal consciousness, but also with the key to liberation that is both realistic and decidedly human: class consciousness. <sup>15</sup>

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<sup>&</sup>lt;sup>11</sup>See chapter 12 (Existence) and 32 (Suffering) of (Edelman, 2020).

<sup>&</sup>lt;sup>12</sup>Metzinger (2017) mentions the positive implications of the idea of anti-natalism for preventing artificial suffering, noting that "It is interesting to see how, for many of us, intuitions diverge for biological and artificial systems" (p.252).

<sup>&</sup>lt;sup>13</sup>I have borrowed the words from the title of (Metzinger, 2018): "Splendor and misery of self-models."

<sup>&</sup>lt;sup>14</sup>See the discussion and the references in (Edelman, 2020, ch.32).

<sup>&</sup>lt;sup>15</sup>This idea is further explored in (Edelman, 2023, ch.7).

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