Phenomenology and the Cognitive Sciences
https://doi.org/10.1007/s11097-023-09885-3

Substance addiction: cure or care?

Nicola Chinchella[1] · **Inês Hipólito**[1,2]

Accepted: 2 January 2023

Abstract
Substance addiction has been historically conceived and widely researched as a brain disease. There have been ample criticisms of brain-centred approaches to addiction, and this paper aims to align with one such criticism by applying insights from phenomenology of psychiatry. More precisely, this work will apply Merleau-Ponty's insightful distinction between the biological and lived body. In this light, the disease model emerges as an incomplete account of substance addiction because it captures only its biological aspects. When considering addiction as a brain disorder, it will be shown that research fails to account for the contextual, functional, and emotional aspects inherent to subjective health. It is concluded that, while the *disease model* is fundamental to our understanding of what happens in the brain, its brain-centred approach is *cure-oriented*. Instead, we suggest a *care-orientated* approach, which understands and treats the psychological feel as bodily experience situated in an environment, allowing for a more encompassing therapeutic perspective.

Keywords Phenomenology of substance addiction · Lived body · Cure and care · Illness and disease

1 Introduction

Substance addiction is often linked to negative cultural stereotypes, such as being "good for nothing", being lazy, being unable to align with a normal life, not having the strength to quit, and being the result of a whim gone wrong, and this often results in heavy stigmatization of the subjects (Matthews, 2019; Earnshaw et al., 2013). This behaviour has two outputs: on the one side, the result of the stigma is

✉ Nicola Chinchella
nicola.chinche@gmail.com

Inês Hipólito
ines.hipolito@hu-berlin.de

[1] Berlin School of Mind and Brain, Humboldt-Universität zu Berlin, Berlin, Germany

[2] Philosophische Fakultät, Institut für Philosophie, Humboldt-Universität zu Berlin, Berlin, Germany

Published online: 13 January 2023

that the subject struggling with substance use is disempowered by public stigmatization and this hampers her ability to seek help (Mincin, 2018; Matthews, 2019; Earnshaw et al., 2013). On the other hand, researchers rejecting addiction as self-chosen, emphasise biological reasons, motivating a brain-centred view of addiction. Discarding self-responsibility leads to the hypothesis of brain dysfunctions. An analogy is useful here: in the case of Alzheimer's disease, one would not make a person suffering from Alzheimer's disease accountable for their fidgeting. The notion of accountability plays a key role in whether or not we deem some behaviour as a disease or as a misadjustment to a specific environment that can, given some conditions, be overcome. Hence, the brain-centred model is intrinsically reductionist, trying to reduce the phenomenon to its biological underpinnings. It implies that, once the underlying neural mechanisms are returned to a "normal" state, addiction would be cured (Ersche et al., 2020; Zehra et al., 2018; Zhang & Volkow, 2019; Heilig et al., 2021; Berridge, 2017). The brain-centred view or disease model of addiction is however increasingly contested in the literature as narrow and even a promoter of social injustice (Hart, 2017; Heather, 2017; Hellman et al., 2022).

This paper aims to show that reducing various aspects implicated in substance addiction to its neurobiological underpinnings, and neglecting the phenomenological experience of being addicted, limits understanding, and importantly, treatment of the affliction. While existent pharmacological treatments are effective and necessary for treating substance addiction (Watson & Lingford-Hughes, 2007; Solinas et al., 2021; Anderson et al., 2021; Heikkinen et al., 2022) over-reliance on them can negatively impact the individual's personal motivation for improving their addiction. On the subject's side, there must be the motivation to adhere to the medication schedule including a willingness to change her activities and surrounding environment. On the medical side, there must be a willingness to understand each subject's history of interactions with the world, from where addiction may have arisen. The predominant focus on pharmacological interventions results in overlooking these phenomenological aspects and might result in relapse (Brandon et al., 2007; Melemis, 2015). To support this, the paper starts by introducing and characterizing the disease model of addiction and presenting classical criticisms against it. The second section turns to the phenomenological critique of reductionism. By applying insights from Merleau-Ponty, it is possible to understand two aspects involved in addiction: the *biological* and the *lived body* or the *disease* and the *illness*, respectively. These insights will be further supported by empirical evidence. Section 3 focuses on the lived body aspects of addiction, detailing the dimensions of bodily subjectivity, bodily directedness, and bodily actions introduced by Merleau-Ponty. These reveal addiction as a generally diminished attenuation to the environment and loss of connection, which results in a 'shrunken lived space'. This enables an understanding of addiction in a more encompassing way: as an *illness* (as opposed to reducing it to a biological *disease*). Treating the *illness* means treating the subject's relationship with her social and physical world, suggesting that two important features of rehabilitation are motivation and generation of meaning or connection: the biological and the lived body. In conclusion, this dual aspect model of addiction – involving both the biological disease and the phenomenological illness – reveal brain-centred 'cure' approaches as insufficient and limited, for they eliminate the value of a subject's discovery of new

and rewarding lived experiences on their journey to recovery. While in this work we frame the question of addiction as being either a disease or an illness, or both, it must be acknowledged that addiction has also been conceptualized as a disability (Maier, 2021), which neither sees it as a disease nor an illness.[1] This we think is compatible with the phenomenological view of lived experience: the directedness towards the world and the ways in which to engage, attune and act upon the world, become fully conditioned and limited by addiction.

This account finds its cradle in the Embodied and Enactive Cognitive Science (EECS) (Gallagher, 2017, 2020; Di Paolo et al., 2018; Newen et al., 2018; Hutto & Myin, 2017; Varela et al., 2016), which are tightly aligned with naturalism (Overgaard et al., 2017; Carel & Meacham, 2013; Zahavi, 2010), even if this requires us to re-think the concept of nature to secure non-reductionist perspectives in cognitive science (Gallagher, 2018; Glackin et al., 2021). EECS is especially relevant in the context of this paper for its recent work on care ethics (Di Paolo & De Jaegher, 2021; Werner & Kiełkowicz-Werner, 2021) and ethical inclusion (van Es & Bervoets, 2021; Hipólito et al., 2020). Moreover, our research, which is grounded in existentialist phenomenology, is tightly linked with Peg O'Connor (2016, 2022), who has published extensive work on understanding addiction as a meaning of life problem. She emphasizes why this problem does not allow for quick fixes, as it requires new skills and ways of living.

The brain disease model, while reductionist, has been fundamental for providing insights into addiction; therefore, the reader should not be surprised that we leverage biological evidence to support our thesis. There must not be an "either-or" kind of thinking, as one approach may account for the setbacks of the other, but tight cooperation between the *brain cure-oriented model* and the *phenomenological care-oriented model* is needed. This work does not purport to have the final word about substance addiction but proposes a new program of research which does not overly commit to the biological body.

[1] We thank an anonymous reviewer for pointing our attention to the work of Maier (2021) where addiction is framed as a disability compatible with the disease and non-disease models. While Maier's account does not speak directly to the issue of addiction being a disease, the argument made in this paper seems highly compatible with his account. Elucidation upon this would require a more thorough analysis than the one we can provide in this paper. One point raised by Maier is that, if addiction is counted as a disability, there is the possibility for 'accommodation', i.e., to work with the subject's local environment for positive behavioural change: "altering the environment in which the addicted persons find themselves in a way that reduces the negative outcomes associated with addicted behaviour" (p. 474). Accommodation and care, we take, are similar insofar as they depict addiction, not as a matter of switching a lever on or off, but as lived in a specific environmental context. Open questions, then, concern how addiction behaviour will play out in the individual narrative of someone who has overcome addiction. While further research is required, intuition would point towards the view that all misadjustments to a specific environmental setting can be seen as a disability, even if they are – as some researchers have claimed in neurodiversity studies – diverse cognitive styles: working 'with the environment to make it more suitable to specific cognitive-behavioural goals (Rosqvist et al., 2020; van Es & Bervoets, 2022).

2 Why the brain disease model of substance addiction?

Drug addiction is defined as a neurobiological disease characterized by compulsive drug use despite negative consequences (National institute of drug abuse [NIDA], 2020). The idea that addiction is a disease is introduced by Alan Leshner (1997): "That addiction is tied to changes in brain structure and functions is what makes it, fundamentally, a brain disease" (p. 3). This reasoning is sustained by theoretical work on disease definition, Christopher Boorse (1997) for example defines disease[2] as a physical state that is statistically different from the species' biological part-function. The rationale behind the disease hypothesis is that addiction changes the way the brain works, as diabetes changes the way the pancreas works. By analogy, since diabetes is a disease then it seems logical to maintain that addiction is also a disease. It is claimed that addicts seem to not have control over their own behaviour leading them to drug intake even when they do not want to; on the one hand, the impossibility to exert voluntary control over addiction makes it even more akin to a disease, "once you've got [addiction], you can't just tell the addict, 'Stop', any more than you can tell the smoker 'Don't have emphysema'" (Leshner, 1997, as cited in Satel & Lilienfeld, 2014). On the other hand, it introduced the compulsive trait of addiction. Addiction was therefore considered an all-or-nothing process, where a "switch in the brain" (Leshner, 1997) affords no withdrawal from the disease. In a nutshell, the hypothesis that addiction is a brain disease was born, and thus the brain became the main locus of research.[3]

The brain approach is not without success, individuals with drug addiction show structural and functional changes in the reward system (VTA, NAcc) suggesting that drugs hijack these circuits altering the release of dopamine (Wise, 1996). Usually, dopamine cells show a decreased response after repeated consumption of a natural reward (e.g., food or sex). With drugs, on the contrary, the level of dopamine release is continuously increased leading to compulsive wanting (Volkow et al., 2016). Moreover, it has been shown that drug consumption triggers much smaller increases in dopamine when addiction is present, as a result, the brain reward system is less sensitive to any kind of reward, becoming less motivated by everyday stimuli (Volkow et al., 2016). This process results in an increased salience of drug cues and a discounting of any other healthy reward cues, and indeed subjects with drug addiction show structural and functional changes in the salience network (OFC, rACC, dACC, anterior insula). Interestingly enough these effects do not disappear through simple termination of use (Volkow et al., 2016). Addiction has also effects on the

[2] We thank an anonymous reviewer for pointing out that there might be some confusion with the terms "disease" and "brain disease". We don't wish to distinguish between these terms in any fundamental way. The terms will therefore be used interchangeably in reference to reductionist approaches.

[3] On the side of these two features the idea to place addiction on the same medical footing with conventional brain disorders as Alzheimer's and Parkinson's bloomed in the USA thanks to NIDA whose direction was Leshner. NIDA thought that it would be easier to have the research founded by the congress and maybe to push insurance companies to extend their coverage if addiction was seen as a disease. Indeed, referring to addiction as a brain disease and showing congress members brain scans did increase funding for research (Satel & Lilienfeld, 2013).

executive control network such as vlPFC and dlPFC and on the normal functioning of regions responsible for goal-seeking behaviour, such as the ventral and dorsal striatum (Goldstein & Volkow, 2011). This results in the diminishment of future-oriented behaviours, excessive valorisation of the present moment (Kemp, 2020), and in loss of self-control, for example, poor control over the urge to take drugs (Goldstein & Volkow, 2011).

Findings that elucidate which brain structures have been disrupted and how they account for lack of control and compulsiveness, suggest the conceptualization of addiction as a disease. The biological evidence leads many to join Nora Volkow to claim that: "In 10 years we will be treating addiction as a disease, and that means with medicine" (Interlandi, 2008). However, not everybody agrees with the brain disease definition of addiction. In the next section, we will present some classical criticism against the brain disease model of addiction.

3 Criticisms and counterarguments against the brain disease model

The brain disease model (Barnett et al., 2018a; Barnett et al., 2018b; Lembke, 2018; Heilig et al., 2021) surely has certain advantages; for example, pinpointing some brain areas where functioning is affected by drug intake. However, it also points towards a reductionist conception of addiction, one which might clash with a subject's individual experience, especially if they feel they were never sick or have been cured (Lewis, 2017). Over the years, there have been heated arguments and counterarguments around the brain disease model (Heather et al., 2018; Field et al., 2019; Lewis, 2022; Alexander, 2022; Hall et al., 2015; Volkow & Koob, 2015). In this work, we focus on selected objections which tackle the features highlighted above, namely, brain changes, disease definition, and compulsivity.

First, we can ask whether physical changes are always connected with disease onset. Marc Lewis (2017), a strong opponent of the brain disease model, stresses how brain changes themselves should not be taken as overarching evidence for a disease. Studying the brain of subjects with drug addiction and then comparing the structures against control patients will surely produce observable differences in structure and functional organization. Yet is this sufficient for the presence of a disease? Lewis proposes that if plasticity in the brain is "the rule, not the exception" (Lewis, 2017) then those studies are not shattering evidence for the disease model. The brain is supposed to change with new experiences and those changes will stabilize and consolidate through repeated experience and exposure. Therefore, even systematic changes in the brain can be interpreted as the fruits of normal functioning in brain structures. Since subjects undergo different experiences, their brain will mirror those, thus it is not surprising that there are differences.

Secondly, the brain disease definition was introduced to tackle the idea that drug use is compulsive[4] (Pickard, 2018). Is compulsiveness then a key feature of

[4] Here it must be noted that, even if the disease model was designed to account for compulsiveness, the lack of it is not enough to sustain that addiction is not a disease (Pickard, 2018)

addiction? As stated above, compulsiveness implies that subjects cannot by any means control their choices. However, there is evidence that addicted individuals with drug addiction can make choices, suggesting that the compulsion model might be inappropriate. For example, addicts can "mature out" of substance misuse without clinical intervention, mostly around their late twenties and early thirties, because incentives such as employment and family are enough to make them stop. Also, individuals with drug addiction can give up on drugs with the right incentive, for example, monetary rewards and small prizes on the condition of a drug-free urine sample (Zajac et al., 2018). These studies suggest that addiction should not be described as something over which subjects cannot have control, but as something over which subjects will not have control. However, this does not demonstrate beyond doubt that addiction is always about an absence of motivation where the possibility to refrain is present since this seems to not be true for all addicts (Pickard, 2018). On the other hand, advocates of the brain disease model counter-argue that contingency management, small financial rewards, or incentives, work when they are immediate and when control has been eroded than altogether lost. Here they stress the importance of completely losing control, but it is not clear what that means or if it even happens, as the difference between "eroded" and "lost" are not clearly defined (Volkow et al., 2016). Even if compulsion might be present in some cases, it is more the exception than the rule. Addiction might therefore be better characterized as an absence of motivation than as a compulsion, and this traces a cleaner line between addiction cases that are commonly conceived of to be brain diseases, in which incentives cannot override the disease.

Finally, it can be argued that addiction should not fall under the term "brain disease". The grounding for such discussion rests on shaky foundations since there is no unequivocal definition of "brain disease". For example, Satel and Lilienfeld (2013) stress another definition of disease which does not encompass addiction. They propose disease as a primary disruption in the functioning of physical processes, which is not the result of deliberate behaviour, nor a condition that cannot be reversed through behavioural means (Satel & Lilienfeld, 2013). Lung cancer, for example, is a lung disease, not because an affected cell started to divide, but because it cannot be halted by patient-initiated behavioural changes. Similarly, schizophrenia is a disease because it is not caused by deliberate behaviour. In this case, addiction does not meet these criteria: it can be the result of deliberate behaviour, and can be reversed through behavioural means. It must be acknowledged that also this definition can be criticized, indeed there is no agreement on a definition of disease, but exactly for this reason it must be treated extremely carefully. Therefore, claiming that addiction is a disease because it falls under the definition given by Boorse (1997) is not a strong argument.

In this section, we have exposed some classic arguments about the disease model of addiction. Lewis (2017) proposes that addiction is not a disease. Pickard (2018) highlights that if the disease model is built upon the assumption of compulsion, it might need to consider motivational factors. The work of Satel and Lilienfeld (2013) indicates that addiction might not fall under the definition of disease depending on whether one considers addiction to involve deliberate behaviours. In what follows

we present our phenomenological model of addiction, one that does not reduce it to a biological disease.

4 Is a disease reducible to physical functioning?

The disease definition of drug addiction is controversial (Lewis, 2022; Field et al., 2019; Volkow & Koob, 2015; Satel & Lilienfeld, 2014; Levy, 2013). Instead of focusing on whether substance addiction is, or it is not a disease, the issue we deal with is the tendency to characterize it solely as a disease, overlooking multiple aspects of addiction that do not reduce to one's neurobiology. In this case, we argue for the more encompassing label of "illness". This section claims for a revision of the reductive approach such that it should expand to cooperate with the fundamental phenomenological experience of living with a body craving. We will argue that this expansion can be comprehensively made by adopting Maurice Merleau-Ponty's theory of the lived and biological body, which can then be strengthened through Havi Carel's distinction between disease and illness; where disease corresponds to biology and illness refers to both biology and lived experience. Therefore, addiction will be considered an illness which entails but does not reduce to the biological dimension. This extended account, we conclude, has important consequences both in treatment and research.

The reductionist view takes it that diseases should be "read off biological facts" (Boorse, 1997), that is iff there are biological reasons, we can pinpoint a disease. However, this view, clearly aligned with the brain disease model of addiction, completely overlooks the "what it is like" to be diseased. This is an important point because if there is no reason to be reductionist,[5] because we understand the importance of phenomenological aspects, diseases should not be taken as merely biological. The phenomenological view avoids reduction and accounts for the feeling of disease, which is imperative to fully delineating disease and illness, all while building on Merleau-Ponty's distinction between the biological body and the lived body.

The biological body is an object that finds its place among other objective entities in the world. It is the understanding of our body through conscious reflection, which makes it a thing that can be divided into parts having a specific function within the whole. The lived body, on the other hand, is the pre-reflective medium interacting with the world. In short, it is the experience of our body: the lived body is the body lived as a subject. There is a fundamental difference between the feeling one has of her own body and the feeling one has of the surrounding objects, for which "my entire body is not for me an assemblage of organ juxtaposed in space [while all the other objects are exactly that]" (Merleau-Ponty, 2012, p. 100–101). The lived body is an intentional body to the extent that it is already directed towards the world to

[5] Here a remark is due, not being reductionist does not entail by any means dualism. We are not arguing that there is a dimension separated from the biological one. What we argue for is that reductionism tends to overlook, while not denying, the phenomenological experience, which is itself rooted in the biological body.

perform possible or actual tasks. This helps to disentangle the idea of bodily subjectivity: my hand is not next to me as my computer is, because my hand has intentionality, therefore my hand is directed towards possible actions in the world. The body, therefore, is not the container of the mind but the condition for having a world and displaying the various dimensions of one's existence. In this sense the dimension of "I can" is more fundamental than the "I think" because it is through actions that I find myself situated, inhabiting, and giving meaning to the world. Situated existence consists of the interactions with the environment, in the sense that *I am what I can do*. These situational aspects are what make experiences 'embodied' and a living being an embodied entity, that is, to be primarily a body which is directed towards the world, and one which answers to the world through bodily actions, beyond the intellectual capacity of thinking the world.

The distinction between the biological and lived body is not ontological, but epistemic: there are not two distinctive aspects required to understand addiction, which should come under a unified explanatory model. This means that no model is reducible to the other: the lived body is biological, and the biological body is lived. The distinction is epistemic because there are two different ways in which the body can be experienced. Being an embodied entity, the body is experienced through its subjectivity, directedness, and action; one's relation to one's body does not take the body as a physical object. There are however cases in which a subject ceases to be an embodied entity and becomes a disembodied entity. Interestingly, it is not until something is 'wrong' and we cannot act upon the world that we direct attention to the body and inspect it as an object of scientific inquiry. This occurs when the dimensions of subjectivity, directedness, and action are disrupted. This has been referred to as 'disembodiment' in the phenomenology of psychiatry for symptoms reported by patients who are diagnosed with schizophrenia and depersonalisation disorder (Kessler & Braithwaite, 2016; de Haan & Fuchs, 2010). Given the lack of attunement with the world – otherwise given by the bodily experience – the body becomes experienced as an object, which then pushes the subjects to inquire about the body as an object to understand what is 'wrong' with it.

In the framework of disease, the difference between the biological body and lived body can be captured through the difference between disease and illness,[6] where "disease is the physiological process while illness is the experience of that process" (Carel, 2016, p. 18). We experience the onset of a disease through our lived body, when the degree of embodiment changes, which implies a modification in the way a person is situated in the environment and directed towards the world (for example not being able to do some tasks that beforehand were routine). Reductionists claim that illness is reducible to disease, which is reducible to the biological dimension, and therefore, that tackling a disease means tackling its biological underpinnings. Yet, is a disease primarily the failure of a physiological system that only secondarily affects the life of the ill subject? Merleau-Ponty suggests that a comprehensive

[6] While we are aware that the first distinction between disease and illness has been introduced by Boorse (1975) we wish to not cite this work because of its clear conflicts with our own and Carel's proposal.

account of disease must acknowledge the lived body dimension, and that a disease is not primarily a biological failure.

Havi Carel (2007) offers pragmatic reasons to accept this irreducibility. Notably, she shows that, on the one hand, there are cases where the biological body is diseased, but the lived body is not felt as ill. These may be life-lasting diseases as permanent disabilities, where although the biological body is objectively diseased, the subject might carry out a life not marked at all by illness. At the beginning, a disease is felt as a restriction of the subjectivity, such as, directedness and possibilities to act, but eventually, the lived body is going to adapt to such restrictions until they are not felt as an illness anymore.[7] On the other hand, we have cases where the biological body is not diseased, but the lived body is felt as ill. In these instances, it is not possible to find in the body anything which, once read "off of biological facts", points towards the presence of a disease. Examples of this can be found in migraine and anorexia, but also in common conditions such as ageing and pregnancy, those we would not call diseases.

The first example highlights how it is possible to have a biological disease while not having the feeling of illness, thus dialling back those dimensions of subjectivity, directedness and action that characterize the healthy lived body. The latter highlights how the feeling of disembodiment, and therefore of illness,[8] might be present while no biological underpinnings are evident. These examples show that the conception of disease as primarily physiological is simplistic and that reducing illness to disease seems a hasty move because illness is not always concomitant with a disease. Therefore, it is plausible to claim that sometimes curing the biological body does not imply curing the lived body, and furthermore, that curing a disease does not always imply curing an illness. This entails that, framing a disease in biological terms might not be always sufficient, for it cannot directly answer questions like: how does illness impact the social and environmental interactions of the ill person? What is the experience of somebody who has a disrupted lived body? And, in the context of addiction: what is the relationship of subjects with drug addiction with their own bodies? How has addiction changed their life? What aspects affect them the most? How can we compensate for those? We will provide answers to these questions in the next section.

Given the necessity to act on these two dimensions, we propose a cure plus care approach (Engel, 1977), where disease can be linked with cure and illness with care. The rationale is that cure-oriented treatments rest on the principle of reductionism seeking to identify quantifiable physical symptoms and the causal mechanisms that give rise to the disease, a general approach applicable to the wider population (De Valck et al., 2001; Sarto-Jackson, 2018). Care-oriented approaches, on the other hand, are particular and focus on the contextual, functional, and emotional aspects

[7] A clear case might be a prosthesis that with time becomes embedded in the body of the agent and is not felt anymore as an extraneous object.

[8] This claim must be taken with caution because it might be read as implying that disembodiment always involves illness. However, that is not what I wish to convey. On the opposite, the claim is that illness involves a special kind of disembodiment which is not pleasurable, while disembodiment, when not induced by illness, might be a positive experience, for example in meditation.

of each subject's health. Care is interested in the experience of the subject, who is considered unique and embedded in a particular situation (Zhao et al., 2016; Tinetti et al., 2016). The difference between a cure-general and care-particular reflects the necessity of tackling different needs. Cure approaches are aimed at the needs of the subject to biologically understand their situation and reverse the course of the disease. However, reversing the course of a disease might require time or might not be possible, in these cases another need arises in the patients, namely the need to understand *how* to live with the disease and how to tackle everyday challenges. A cure-oriented approach is effective but looks at the subject as biological, as a compound of parts that can be fixed. Care-oriented approaches go beyond this conception and consider the subject in her situatedness and in her environmental interactions, with an aim to figure out subjective ways to be in the world with dignity. Given this characterization, it is clear that the disease model of addiction is cure-oriented while the phenomenological approach is care-oriented.

In this section, we tackled the question of whether reducing a disease to its biological underpinnings is a comprehensive level of analysis and argued against this conception. Even if some might claim that we do not have a complete understanding of phenomena such as migraine or anorexia, or that ageing and pregnancy ought to fall under the definition of disease, it remains the fact that, given the possibility of a discrepancy between disease and illness, it is crucial to address both independently. We cannot take for granted that curing the biological side always implies curing the lived body, therefore, the dimension of care for the personal experience must complement the dimension of cure for the biological body. In the next section, we will propose an exploratory lived body framework for drug addiction.

5 First-person accounts of substance addiction disorder

Above we proposed questions that will shed light on the lived body experience in addiction. In this section, we will support them through first-person reports. Specifically, we won't tackle the first two general questions which are extensively treated by Carel (2007, 2013, 2016), but focus only on those that are closely linked with addiction. Our overarching purpose is to advance a new approach to substance addiction; hence this section's aim is to highlight lived body disruptions in addiction. However, given that substance addiction can take many forms, it is not our aim to propose an exhaustive first-person account of all forms of substance addiction. Accordingly, this section will rather serve as a preliminary illustration to pave the way for further work. The working definition of lived body illness we propose is grounded upon the disruption of the pre-reflective relationship with the body. In line with recent developments in psychopathology in which mental conditions are not localized in the hidden convolutions of the brain nor in the hidden corners of the patient's psyche, but rather in her lived experiences and relations with others (Fuchs et al., 2019), we aim to show how addiction disrupts the lived body. To achieve our aim, first, we tackle the dimensions of bodily intentionality and bodily actions. In particular, we explore a drug-addicted body's diminished attunement to the environment, thereby leading to a subject's perception of its ecological niche as constricted, fragmented and

unfitting, ultimately resulting in few actions performed. Building on this and following both the theory that a healthy sense of self that is grounded in these three dimensions being intact (Fuchs, 2007; de Haan & Fuchs, 2010; Ciaunica et al., 2021a, b) as well as the disruption of the sense of self in addiction (Kemp, 2019), we show that bodily subjectivity is also disrupted. This angle allows us to propose a novel tie between addiction, bodily subjectivity, and the sense of self.

We now proceed to argue that bodily intentionality, or bodily directedness towards possibilities in the world, is disrupted. Dennis (2017, 2020) uses the approach of body mapping to understand the relationship of subjects with their own body and the world. Dennis (2017) highlights how for the majority of subjects with drug addiction, the drug plays an important role in enabling everyday activities. For example, she highlights how drugs help subjects contain their sense which before use are overloaded by an outside world that moves in and comes too close for comfort "Everything is all 'oh oh' [makes sounds and gestures to show how things get too close] … it's just like you can't handle busy high streets" (Dennis, 2020, pp. 12). The un-drugged body is therefore not a perfect medium to interact with the world, in her own words "bodies that have become-with drugs, are seen to lose their connectivity with the world in becoming focused and reliant on this one connection [drug]"(Dennis, 2020, pp. 2). This loss of connection is also highlighted by Kemp (2011), who describes how the drug-addicted body leads to a general withdrawal from the world with fewer and fewer social contacts resulting in avoidance of spaces and restriction of life in "safe" places: "I might call a friend [after using] but most of the day is just me on my own at home" (Kemp, 2011, p.4), "I am back [home] soon, as I want to avoid other people" (Kemp, 2011, p.3). Moreover, there is little differentiation in contacts, with relationships characterized by dishonesty and manipulation (Hammer et al., 2012). The world is therefore perceived as overwhelming, uncontrollable, and scary. Transparent bodily mediation is achieved only when drugs are present with an increased capacity for "interest in something, on the radio or TV or books" (Dennis, 2020). However, this mediation does not fall under the socially accepted way of mediating, thus leading to a withdrawal from the world because of the feeling of being different and stigmatized (Mincin, 2018; Matthews, 2019; Earnshaw et al., 2013). It is therefore plausible to hypothesize that bodily directedness is narrowed down, which connects also to the third dimension of the pre-reflective body, namely action. Perceiving the world as overwhelming and having a transparent body only through drugs does not allow for many actions, thus inserting the subjects in a loop of craving and "fixing" which lends itself to a few explorative efforts and thus to an existence enclosed always in the same patterns.

Given that the three dimensions of the lived body are naturally and tightly intertwined, a disruption in bodily intentionality and actions is a hint at exploring a change in bodily subjectivity. In the literature, a disruption in bodily subjectivity is often addressed through the description of the body as not belonging to the subject anymore for example in schizophrenia and depersonalization (Fuchs, 2007; Ciaunica et al., 2021b). However, this kind of disruption is at the end of a spectrum, as Carel (2007, 2013, 2016) highlights, the simply lived sensation that the mediating role of the body is disrupted is enough to spot a change in the degree of bodily subjectivity. While this conclusion is already supported by the evidence provided above, we

also argue that there are two more indicators of this. First, the drug-addicted body becomes a locus of pain. Kemp (2009) highlights how first-person reports suggest that "the subject seeks drugs to continue their existence without the pain of cravings and withdrawal. Pleasure may have been the initial driver, but now it is the avoidance of pain, which dominates" (p. 11). His vision is also shared by Dennis (2020) who highlights how the bodies have learned to "become-with drugs, becoming anxious in their absence" (p. 13) but re-energized when the preferred drug is present. The body is thus a locus of constant objectifying attention, because of the need to quell the pain as well as the feeling that the undrugged body does not mediate efficiently anymore. This, moreover, "leads to a hatred and distrust of the body, which is no longer a foundation on which the self-project is founded, but an inconsistent and dishonourable host" (Kemp, 2009, p. 11). It is paradigmatic here the use of the word "host" which highlights how, far from being a subject, the body is considered an object. The rift between the body and the narrative subject is also traceable in first-person reports mirroring how the body imposes courses of action, for example seeking drugs, "Your body knows it too, but your brain will not accept it" (Trujillo, 2004, p. 2), that are not always shared by the rational subject (Kemp, 2009, 2020; Trujillo, 2004). Indeed, drug intake will always be privileged over any other environmental or subjective requirement, thus leading to the discounting of activities that before were deemed as fundamental. In extreme cases, subjects lose their jobs, their houses, and their loved ones. As a subject astonishingly puts it: "Crack helps you forget everything even your children" (Trujillo, 2004, p. 16). Crack is naturally an extreme example, however, a discrepancy between the bodily wishes and the subjective wishes is highlighted by the feelings of shame, self-loathing, and guilt commonly reported by users of different drugs (Kemp, 2020). Secondly, the body has been described as less "mine" not only when in withdrawal and calling for its own relief, but equally when drugs are present, in moments of "loss of self" (Kemp, 2009). Indeed, while drugs allow the body to work properly and thus not to be an object of inquiry, when they are taken there is a shift in the subjectivity. Subjects report that "as soon as I've had something I'm completely changed [..] totally different" (Dennis, 2017, pp. 11) with others depicting this change of self "in drawing a picture of herself as superwoman" (Dennis, 2017, pp. 11). The result of bodily subjectivity continuously passing from these two opposite points is leaving the subject with a confused sense of herself (Kemp, 2019).

To recapitulate, the aspects which change the most in the addicted life are the ones related to the interactions with the world, leading to fewer and fewer actions performed and to a little differentiation in actions, thus a shrunken horizon of possibilities. This results in a narrowed-down meaning of life until it encompasses only drugs. Drugs thus affect bodily health and social connections until the addict finds herself alone without connections with the outside world but the one provided by the drug. This is supported by other subjects reporting how drug intake, at least in the long run, leads subjects into an inward closure (Trujillo, 2004) with a life described as narrow, inactive, and chaotic (Kemp, 2020), that revolves around very little contact with others. Regarding the subject's relationship with her body, it seems that in drug addiction the body becomes more of an object than a subject because instead of being a transparent medium of what the world can offer, it is an opaque locus of

attentional need. There is a shift of attention from the world to the body in itself (Kemp, 2020).

The disruptions of the lived body are not only supported by first-person reports but also by disruptions in proprioception and interception which are fundamental for the sense of self (Kemp, 2020), as well as for bodily intentionality and actions.

Proprioception modulates the sense of body location, thereby playing an important role in movement and interaction with the environment. For example, when we want to grasp a glass, we do not need to put conscious attention to the degree of the finger's opening or the pressure necessary for holding it, as well as when we move it towards our mouth we do not need to track consciously where the movement is landing. Proprioception, furthermore, offers temporal situatedness that integrates the organism's current states with future states to attain self-preservation, thus maintaining bodily homeostasis. Homeostasis, on the other hand, is deeply intertwined with another perceptual system called interoception, which is "the ability of the organism to monitor and experience itself" (Kemp, 2020). This internal monitoring is necessary for the organism to attend to its needs, like hunger, pain, etc. Interoception is also linked with the perception of time, especially the future, for example to expectations and prediction. Interoception, generally, is related to self-awareness, the sense of the self, the sense of temporal continuity, agency, and intention.

The unity of proprioception and interoception is the biological ground for the body's subjectiveness and directedness towards possible actions, and it is plausible to hypothesize that both are disrupted in some form of addiction. At the neurobiological level, it has been reported that drug-addicted individuals have impaired functioning in brain parts associated with interoception, for example in the insula, anterior cingulate cortex, and dorsal striatum (Goldstein et al., 2009) resulting in a generalized decreased ability for interoception (Sönmez et al., 2017). The disruption of interoception has the effect of steering homeostasis away thus neglecting the needs of the body, which in extreme cases might lead to death. Moreover, interoception is affected by compromised awareness of bodily processes. This can be identified in episodes of failure to identify the illness or denial of it, and false belief that one is in control over drug-taking behaviour; shown by the discrepancy between verbal reports, "I am going to quit", and behaviour, intake of drugs.

Concerning proprioception, there is an overall absence of neurobiological evidence, which might be due to the lack of interest in the dimension of action and interaction with the environment displayed by the disease model. However, from a phenomenological point of view, it is possible to hypothesize that proprioception is disrupted. Proprioception should be able to offer to the subject a spatial/temporal situatedness in the world so that the latter is seen as a horizon of possibilities. However, as was shown above, the world is not always experienced in such a manner.

The hypothesis that proprioception and interoception are disrupted is also supported by evidence of affected temporal dimension in addiction, which is deeply correlated with proprioception and interoception. The temporal dimension is now-oriented while being future-closed (Kemp, 2020). The loss of future-oriented thinking causes the craving to be imagined as ceaseless and thus unbearable, therefore the impulse is satisfied despite long-term effects. The high concentration on the nowness of the moment, as well as their desire to accelerate time as it passes,

might explain the compulsivity in addiction, suggesting that other than incentives, the ability to foresee and plan meaningfully might help with the feeling of compulsion. Moreover, subjects with drug addiction often stress that their past is unclear to them as if the years passed never existed which is linked with a disruption of the sense of self (Kemp, 2019, 2020), for which both interoception and proprioception are fundamental.

Overall, it seems there are compelling reasons to think that, given the evidence of loss of bodily subjectivity, of bodily directedness and intentionality, as well as fewer actions performed, addiction can be considered a lived body disease. Highlighting and linking the disruption across these three dimensions was our aim in this paper. Yet, much is still to be considered with respect to its relationship with disembodiment, particularly clear in the literature concerning schizophrenia and disembodiment (Kessler & Braithwaite, 2016; de Haan & Fuchs, 2010). In light of the reasoning provided in this paper, future research should inquire whether disembodiment is present in addiction as a next natural step in the form of first-person reports (Dennis, 2020, p.12).

In the next section, we will explicitly indicate how the link between bodily subjectivity, directedness, and intentionality plays a crucial role in the treatment of addiction.

6 The phenomenological approach to substance addiction

In the previous section we showed that in drug addiction, it is possible to point out lived body disturbances and offered reasons to address the lived body dimension of addiction together with its biological one. This was possible through a phenomenological approach to addiction, which has the advantage of taking into consideration the subject and her experience, resulting in consequences both in the field of treatment and of research, which we will now tackle in this order.

First, a phenomenological account takes motivation in high regard, which has two different sides. Primarily it allows us to answer the question: "Why do people take drugs in the first place?". Müller and Schumann (2011) draw seven functions of drugs: 1) improved social interaction, 2) facilitated mating and sexual behaviour, 3) improved cognitive performance and counteracting fatigue, 4) facilitated recovery and coping with psychological stress, 5) self-medication for mental health problems, 6) sensory curiosity, 7) euphoria and hedonia. As we see all these factors directly speak to the lived body and fulfil some valuable ends, hence the question: is pharmacological treatment, as Volkow (Interlandi, 2008) suggests, the way to treat addiction? If we take seriously the functions theorized by Müller and Schumann, pharmacological treatment might relieve the brain from being hijacked by drugs and give an alternative to solve temporarily the problems posed by the lived body, but in doing so, it is just substituting drugs while not acting on the reasons why subjects take them. The inability of the disease model to tackle those reasons might even impede subjects from recovering because it does not provide good motivations to stop. What is needed, instead, is to provide subjects with other means to fulfil the same aim.

Second, a phenomenological account poses the question: why is motivation fundamental for quitting drugs? Motivation is fundamental to the extent that it diminishes the importance of drugs in comparison with other events. The rationale behind this observation is the biological hypothesis that the disruption of the reward system caused by drugs acts on what is maintained as meaningful by the subject. While there is biological evidence for this, as noted above, the lived body framework also points toward this conclusion. Indeed, if we take meanings as being inherently bounded with sense-making (De Jaegher & Di Paolo, 2007), and we take sense-making as defined in the enactive literature as relational, which means that our environment is selectively created through our interactions with the world such that the organism is not passively receiving meaning from the environment but participates in the creation of it, lived body disruptions affect the possibility of creating meanings. In other words, if meanings are generated through environmental interactions, but those are narrowed and biased by drugs, it is tenable to claim that in addiction there is a disruption of meaning, leading to a lived body incapable of finding meaningful connections with the environment. This results in a process of discounting activities deemed before as fundamental, such as sports, work, or family. The life of a subject with drug addiction is portrayed by relationships characterized by dishonesty and manipulation (Hammer et al., 2012), an increase in negative emotions, and a deconstruction of the subject's sense of self, enhancing self-loathing and shame (Kemp, 2020). This hypothesis suggests that meaning creation, as well as meaning maintenance, is fundamental for giving up on substance addiction and that motivation to create new meanings or to hold on to the ones already present is a key factor for recovery. This is sustained by reports which highlight how recovery, far from being attained only through pharmacology, involves processes of nurturing the self, creating a new identity, and developing a healthy relationship with time (Kemp, 2019). The cornerstone of addiction treatment is meaning creation, which, as phenomenology suggests, needs to be answered on the individual level.

Indeed, the second role phenomenology plays is to account for subjectivity. The disease model is interested in getting the person "clean", which means, curing the biological underpinnings of addiction. In doing so they tend to unify all the experiences and find a cure that is viable for everybody. However, this type of account neglects one of the most important features of addiction: it is intrinsically subjective. Thus, it is not able to account for the situatedness and the motivation that pushes subjects to take drugs. Subjects with drug addiction also need to be cared for, which means being helped individually in instantiating new meaningful connections with the world, which are ultimately rewarding without drugs. Even if pharmacological treatments are of great help, it is not clear how they can permanently address a shrunken lived space or the failure to attune to the environment (Miller et al., 2020).

While many treatment centres already integrate this perspective, much research based on the brain disease model does not yet. A phenomenological account of addiction opens and motivates new lines of research in substance addiction treatment (Copoeru, 2018). One question is how meaning is created in the relationships we entertain in our environments, which leads to whether meaning should be considered a relational phenomenon and how addiction can diminish the meaning of other activities so heavily. This question already has a biological answer,

and therefore it is important to inquire about it in relation to the lived experience of drug intake. Another line of research might be to inquire whether it is possible to attain the same level of discounting but in the opposite direction and if yes, through which nonpharmacological means? Lastly, as highlighted above there is a general lack of study about proprioception in addiction which, in the light of the reasoning in this paper, is fundamental.

7 Conclusion

The model presented in this paper claimed that substance addiction cannot be fully captured within a reductionist view. We proposed to take into consideration the phenomenological approach and argued that reduction to the brain does not provide a comprehensive framework for understanding addiction. Furthermore, using the lived body as the methodology to inquire about the experience of drug addiction showed how it validates the thesis that substance addiction must be considered as a lived body disease next to its neurobiological underpinnings. Finally, leveraging the notion of motivation and meaning, we showed how drug addiction can be conceptualized as an inability to use the body to find meaningful connections with the environment. Therefore, we suggested that some questions which already have an answer at the biological level ought to be tackled at the lived body level to foster our understanding of processes, such as discounting and meaning creation.

The model we proposed has the advantage of being care-oriented, caring for the subject's difficulties to break free from addiction, which is intrinsically subject-related and cannot be reduced to general principles, as well as reversing cultural stereotypes and stigmatisation. The special attention to subjectivity proposed in this account promotes the message that treating addiction is not only about drugs, but also about anxiety, depression, and other psychological challenges in re-establishing a healthy relationship with the world. Moreover, what has been stressed is that pharmacological treatments themselves are not enough and they should be pursued in parallel to a treatment that tackles the challenges faced at the level of interpersonal relations and the generation of meaning, let alone public policies. Thus, it is important to adapt the clinical setting to these insights by finding new ways to treat addiction while maintaining the dimension of care as primary.

Far from proposing to abandon the disease model of addiction altogether, this article suggests that the best way to tackle a complex phenomenon as addiction is a combination of the two approaches: the cure-oriented brain model and the care-oriented phenomenological model. While biology and quantitative psychology can highlight the mechanisms at play in the brain, qualitative, phenomenological research might be able to provide means to reverse those mechanisms, which in turn, might provide powerful insights for the aforementioned.

Acknowledgements Inês Hipólito's work has been funded by the Philosophische Fakultät, Institut für Philosophie, Humboldt-Universität zu Berlin.

Funding Open Access funding enabled and organized by Projekt DEAL.

Declarations

Conflict of interest The authors have no financial or proprietary interests in any material discussed in this article.

References

Alexander, B. K. (2022). Replacing the BDMA: A paradigm shift in the field of addiction. In *Evaluating the brain disease model of addiction* (pp. 522–538). Routledge.

Anderson, A. C., Youssef, G. J., Robinson, A. H., Lubman, D. I., & Verdejo-Garcia, A. (2021). Cognitive boosting interventions for impulsivity in addiction: a systematic review and meta-analysis of cognitive training, remediation and pharmacological enhancement. *Addiction (Abingdon, England), 116*(12), 3304–3319. https://doi.org/10.1111/add.15469

Barnett, A. I., Hall, W., Fry, C. L., Dilkes-Frayne, E., & Carter, A. (2018a). Drug and alcohol treatment providers' views about the disease model of addiction and its impact on clinical practice: A systematic review. *Drug and Alcohol Review, 37*(6), 697–720.

Barnett, A., Hall, W., Fry, C. L., Dilkes-Frayne, E., & Carter, A. (2018b). Implications of treatment providers' varying conceptions of the disease model of addiction: A response.

Berridge, K. C. (2017). Is addiction a brain disease? *Neuroethics, 10*(1), 29–33. https://doi.org/10.1007/s12152-016-9286-3

Boorse, C. (1975). On the distinction between disease and illness. *Philosophy & Public Affairs, 5*(1), 49–68.

Boorse, C. (1997). A rebuttal on health. In J. M. Humber & R. F. Almeder (a c. Di), *what is disease?* (pagg. 1–134). Humana press. https://doi.org/10.1007/978-1-59259-451-1_1

Brandon, T. H., Vidrine, J. I., & Litvin, E. B. (2007). Relapse and relapse prevention. *Annual Review of Clinical Psychology, 3*(1), 257–284. https://doi.org/10.1146/annurev.clinpsy.3.022806.091455

Carel, H. (2007). Can I be ill and happy? *Philosophia, 35*(2), 95–110. https://doi.org/10.1007/s11406-007-9085-5

Carel, H. (2016). *Phenomenology of illness*. Oxford University Press.

Carel, H. (2013). Bodily doubt. *Journal of Consciousness Studies, 20*(7–8), 7–8.

Carel, H., & Meacham, D. (2013). Phenomenology and naturalism: Examining the relationship between human experience and nature. Cambridge University Press, 341pp.

Ciaunica, A., Hesp, C., Seth, A., Limanowski, J., & Friston, K. (2021a). *I overthink—therefore I am not: Altered Sense of Self and Agency in Depersonalisation Disorder* [Preprint]. PsyArXiv. https://doi.org/10.31234/osf.io/k9d2n.

Ciaunica, A., McEllin, L., Kiverstein, J., Gallese, V., Hohwy, J., & Woźniak, M. (2021b). *Zoomed out? Depersonalization is Related to Increased Digital Media Use During the COVID-19 Pandemic Lockdown*. PsyArXiv. https://doi.org/10.31234/osf.io/8jver.

Copoeru, I. (2018). Portraying addiction as a disease: A phenomenological answer. *Journal of Evaluation in Clinical Practice, 24*(5), 1101–1106. https://doi.org/10.1111/jep.13022

de Haan, S., & Fuchs, T. (2010). The ghost in the machine: Disembodiment in schizophrenia – Two case studies. *Psychopathology, 43*(5), 327–333. https://doi.org/10.1159/000319402

De Jaegher, H., & Di Paolo, E. (2007). Participatory sense-making. *Phenomenology and the Cognitive Sciences, 6*(4), 485–507. https://doi.org/10.1007/s11097-007-9076-9

Dennis, F. (2017). The injecting 'event': Harm reduction beyond the human. *Critical Public Health, 27*(3), 337–349. https://doi.org/10.1080/09581596.2017.1294245

Dennis, F. (2020). Mapping the drugged body: Telling different kinds of drug-using stories. *Body & Society, 26*(3), 61–93. https://doi.org/10.1177/1357034X20925530

De Valck, C., Bensing, J., Bruynooghe, R., & Batenburg, V. (2001). Cure-oriented versus care-oriented attitudes in medicine. *Patient Education and Counseling, 45*(2), 119–126. https://doi.org/10.1016/S0738-3991(00)00201-9

Di Paolo, E. A., & De Jaegher, H. (2021). Enactive ethics: Difference becoming participation. *Topoi, 1-16*. https://doi.org/10.1007/s11245-021-09766-x

Di Paolo, E. A., Cuffari, E. C., & De Jaegher, H. (2018). *Linguistic bodies: The continuity between life and language*. MIT press.

Earnshaw, V., Smith, L., & Copenhaver, M. (2013). Drug addiction stigma in the context of methadone maintenance therapy: An investigation into understudied sources of stigma. *International Journal of Mental Health and Addiction, 11*(1), 110–122. https://doi.org/10.1007/s11469-012-9402-5

Engel G. L. (1977). The need for a new medical model: a challenge for biomedicine. *Science (New York, N.Y.), 196*(4286), 129–136. https://doi.org/10.1126/science.847460

Ersche, K. D., Meng, C., Ziauddeen, H., Stochl, J., Williams, G. B., Bullmore, E. T., & Robbins, T. W. (2020). Brain networks underlying vulnerability and resilience to drug addiction. *Proceedings of the National Academy of Sciences, 117*(26), 15253–15261. https://doi.org/10.1073/pnas.2002509117

Field, M., Heather, N., & Wiers, R. W. (2019). Indeed, not really a brain disorder: Implications for reductionist accounts of addiction. *Behavioral and Brain Sciences*, *42*.

Fuchs, T. (2007). Psychotherapy of the lived space: A phenomenological and ecological concept. *American Journal of Psychotherapy, 61*(4), 423–439. https://doi.org/10.1176/appi.psychotherapy.2007.61.4.423

Fuchs, T., Messas, G. P., & Stanghellini, G. (2019). More than just description: Phenomenology and psychotherapy. *Psychopathology, 52*(2), 63–66. https://doi.org/10.1159/000502266

Gallagher, S. (2017). *Enactivist interventions: Rethinking the mind*. Oxford University Press.

Gallagher, S. (2018). Rethinking nature: Phenomenology and a non-reductionist cognitive science. *Australasian Philosophical Review, 2*(2), 125–137. https://doi.org/10.1080/24740500.2018.1552074

Gallagher, S. (2020). *Action and interaction*. Oxford University Press.

Glackin, S. N., Roberts, T., & Krueger, J. (2021). Out of our heads: Addiction and psychiatric externalism. *Behavioural Brain Research, 398*, 112936. https://doi.org/10.1016/j.bbr.2020.112936

Goldstein, R. Z., & Volkow, N. D. (2011). Dysfunction of the prefrontal cortex in addiction: Neuroimaging findings and clinical implications. *Nature Reviews Neuroscience, 12*(11), 652–669. https://doi.org/10.1038/nrn3119

Goldstein, R. Z., Craig, A. D. (. B.)., Bechara, A., Garavan, H., Childress, A. R., Paulus, M. P., & Volkow, N. D. (2009). The Neurocircuitry of impaired insight in drug addiction. *Trends in Cognitive Sciences, 13*(9), 372–380. https://doi.org/10.1016/j.tics.2009.06.004

Hall, W., Carter, A., & Forlini, C. (2015). The brain disease model of addiction: is it supported by the evidence and has it delivered on its promises?. The lancet. *Psychiatry, 2*(1), 105–110. https://doi.org/10.1016/S2215-0366(14)00126-6

Hammer, R. R., Dingel, M. J., Ostergren, J. E., Nowakowski, K. E., & Koenig, B. A. (2012). The experience of addiction as told by the addicted: Incorporating biological understandings into self-story. *Culture, Medicine and Psychiatry, 36*(4), 712–734. https://doi.org/10.1007/s11013-012-9283-x

Hart, C. L. (2017). Viewing addiction as a brain disease promotes social injustice. *Nature Human Behaviour, 1*(3), 1–1. https://doi.org/10.1038/s41562-017-0055

Heather, N. (2017). Q: Is addiction a brain disease or a moral failing? A: Neither. *Neuroethics, 10*(1), 115–124. https://doi.org/10.1007/s12152-016-9289-0

Heather, N., Best, D., Kawalek, A., Field, M., Lewis, M., Rotgers, F., ... & Heim, D. (2018). Challenging the brain disease model of addiction: European launch of the addiction theory network. *Addiction Research & Theory*, *26*(4), 249–255.

Heikkinen, M., Taipale, H., Tanskanen, A., Mittendorfer-Rutz, E., Lähteenvuo, M., & Tiihonen, J. (2022). Real-world effectiveness of pharmacological treatments of opioid use disorder in a national cohort. *Addiction (Abingdon, England), 117*(6), 1683–1691. https://doi.org/10.1111/add.15814

Heilig, M., MacKillop, J., Martinez, D., Rehm, J., Leggio, L., & Vanderschuren, L. J. (2021). Addiction as a brain disease revised: Why it still matters, and the need for consilience. *Neuropsychopharmacology*, 1–9. https://doi.org/10.1038/s41386-020-00950-y.

Hellman, M., Egerer, M., Stoneham, J., Forberger, S., Männistö-Inkinen, V., Ochterbeck, D., & Rundle, S. (2022). *Addiction and the brain: Knowledge, beliefs and ethical considerations from a social perspective*. Springer Nature.

Hipólito, I., Hutto, D., & Chown, N. (2020). Understanding autistic individuals. *Neurodiversity Studies: A New Critical Paradigm*.

Hutto, D. D., & Myin, E. (2017). *Evolving enactivism: Basic minds meet content*. MIT press.

Interlandi J. (2008) *What Addicts Need*. Newsweek. http://www.newsweek.com/2008/02/23/what-addicts-need.html

Kemp, R. (2009). The lived-body of drug addiction. *Existential Analysis, 20*(1), 120–132.

Kemp, R. (2011). The worlding of addiction. *The Humanistic Psychologist, 39*(4), 338–347. https://doi.org/10.1080/08873267.2011.618040

Kemp, R. (2019). Addiction and addiction recovery: A qualitative research viewpoint. *Journal of Psychological Therapies, 4*, 167–179. https://doi.org/10.33212/jpt.v4n2.2019.167

Kemp, R. (2020). Addiction as temporal disruption: Interoception, self, meaning. *Phenomenology and the Cognitive Sciences, 19*(2), 305–319. https://doi.org/10.1007/s11097-018-9578-7

Kessler, K., & Braithwaite, J. J. (2016). Deliberate and spontaneous sensations of disembodiment: Capacity of flaw? *Cognitive Neuropsychiatry, 21*(5), 412–428.

Lembke, A. (2018). Why addiction should be considered a disease. *The Judges' Journal, 57*, 4.

Leshner, A. I. (1997). Addiction is a brain disease, and it matters. *Science, 278*(5335), 45–47. https://doi.org/10.1126/science.278.5335.45

Levy, N. (2013). Addiction is not a brain disease (and it matters). *Frontiers in Psychiatry, 4*. https://doi.org/10.3389/fpsyt.2013.00024

Lewis, M. (2017). Addiction and the brain: Development. *Not Disease. Neuroethics, 10*(1), 7–18. https://doi.org/10.1007/s12152-016-9293-4

Lewis, M. (2022). Brain change in addiction: Disease or learning?: Implications for science, policy, and care. In Evaluating the Brain Disease Model of Addiction (pp. 196–202). Routledge.

Maier, J. T. (2021). Addiction is a disability, and it matters. *Neuroethics, 14*(3), 467–477. https://doi.org/10.1007/s12152-021-09466-8

Matthews, S. (2019). Self-Stigma and addiction. In *The Stigma of Addiction* (pp. 5–32). Springer, Cham. https://doi.org/10.1007/s11673-017-9784-y.

Melemis, S. M. (2015). Relapse prevention and the five rules of recovery. *The Yale Journal of Biology and Medicine, 88*(3), 325–332.

Merleau-Ponty, M. (2012). *Phenomenology of perception*. Routledge.

Miller, M., Kiverstein, J., & Rietveld, E. (2020). Embodying addiction: A predictive processing account. *Brain and Cognition, 138*, 105495. https://doi.org/10.1016/j.bandc.2019.105495

Mincin, J. (2018). Addiction and stigmas: Overcoming labels, empowering people. In T. MacMillan & A. Sisselman-Borgia (Eds.), *New directions in treatment, education, and outreach for mental health and addiction* (pp. 125–131). Springer International Publishing/Springer Nature. https://doi.org/10.1007/978-3-319-72778-3_9

Müller, C. P., & Schumann, G. (2011). Drugs as instruments: A new framework for non-addictive psychoactive drug use. *Behavioral and Brain Sciences, 34*(6), 293–310. https://doi.org/10.1017/S0140525X11000057

Newen, A., De Bruin, L., & Gallagher, S. (Eds.). (2018). *The Oxford handbook of 4E cognition*. Oxford University Press.

NIDA (2020). July 13. Drug misuse and addiction. Retrieved from https://www.drugabuse.gov/publications/drugs-brains-behavior-science-addiction/drug-misuse-addiction on 2021, September 13.

O'Connor, P. (2016). *Life on the rocks: finding meaning in addiction and recovery*. Central Recovery Press.

O'Connor, P. (2022). *Higher and friendly powers: Transforming addiction and suffering*. Wildhouse Publications.

Overgaard, S., Romdenh-Romluc, K., Cerbone, D., & Reynolds, J. (2017). *Phenomenology, naturalism and science: A hybrid and heretical proposal*. Routledge.

Pickard, H. (2018). The puzzle of addiction. In H. Pickard & S. Ahmed (Eds.), *The Routledge handbook of philosophy and science of addiction* (pp. 9–20). Routledge.

Rosqvist, H. B., Chown, N., & Stenning, A. (Eds.). (2020). *Neurodiversity studies: A new critical paradigm*. Routledge.

Sarto-Jackson, I. (2018). Time for a change: Topical amendments to the medical model of disease. *Biological Theory, 13*, 29–38. https://doi.org/10.1007/s13752-017-0289-z

Satel, S., & Lilienfeld, S. O. (2013). *Brainwashed: The seductive appeal of mindless neuroscience*. Basic Books.

Satel, S., & Lilienfeld, S. O. (2014). Addiction and the brain-disease fallacy. *Frontiers in Psychiatry, 4*, 141. https://doi.org/10.3389/fpsyt.2013.00141

Solinas, M., Chauvet, C., Lafay-Chebassier, C., Jaafari, N., & Thiriet, N. (2021). Environmental enrichment-inspired pharmacological tools for the treatment of addiction. *Current Opinion in Pharmacology, 56*, 22–28.

Sönmez, M. B., Kahyacı Kılıç, E., Ateş Çöl, I., Görgülü, Y., & Köse Çınar, R. (2017). Decreased interoceptive awareness in patients with substance use disorders. *Journal of Substance Use, 22*(1), 60–65. https://doi.org/10.3109/14659891.2016.1143048

Tinetti, M. E., Naik, A. D., & Dodson, J. A. (2016). Moving from disease-centered to patient goalsdirected care for patients with multiple chronic conditions: Patient value-based care. *JAMA Cardiology, 1*(1), 9–10.

Trujillo, J. (2004). *An Existential-Phenomenology of Crack Cocaine Abuse*. 21.

van Es, T., & Bervoets, J. (2021). Autism as gradual sensorimotor difference: From enactivism to ethical inclusion. *Topoi*, 1-13. https://doi.org/10.1007/s11245-021-09779-6.

van Es, T., & Bervoets, J. (2022). Autism as gradual sensorimotor difference: From enactivism to ethical inclusion. *Topoi, 41*(2), 395–407.

Varela, F. J., Thompson, E., & Rosch, E. (2016). *The embodied mind: Cognitive science and human experience*. MIT press.

Volkow, N. D., & Koob, G. (2015). Brain disease model of addiction: why is it so controversial?. The lancet. *Psychiatry, 2*(8), 677–679. https://doi.org/10.1016/S2215-0366(15)00236-9

Volkow, N. D., Koob, G. F., & McLellan, A. T. (2016). Neurobiologic advances from the brain disease model of addiction. *New England Journal of Medicine, 374*(4), 363–371. https://doi.org/10.1056/NEJMra1511480

Watson, B., & Lingford-Hughes, A. (2007). Pharmacological treatment of addiction. *Psychiatry, 6*(7), 309–312. https://doi.org/10.1016/j.mppsy.2007.04.008

Werner, K., & Kiełkowicz-Werner, M. (2021). From shared enaction to intrinsic value. How Enactivism Contributes to Environmental Ethics. *Topoi*, 1–15. https://doi.org/10.1007/s11245-021-09750-5.

Wise, R. A. (1996). Neurobiology of addiction. *Current Opinion in Neurobiology, 6*(2), 243–251. https://doi.org/10.1016/s0959-4388(96)80079-1

Zahavi, D. (2010). Naturalized phenomenology. In *Handbook of phenomenology and cognitive science* (pp. 2–19). Springer.

Zajac, K., Alessi, S. M., & Petry, N. M. (2018). Contingency management approaches. In H. Pickard & S. Ahmed (Eds.), *The Routledge handbook of philosophy and science of addiction* (pp. 455–463). Routledge.

Zehra, A., Burns, J., Liu, C. K., Manza, P., Wiers, C. E., Volkow, N. D., & Wang, G. J. (2018). Cannabis addiction and the brain: A review. *Journal of Neuroimmune Pharmacology, 13*(4), 438–452. https://doi.org/10.1007/s11481-018-9782-9

Zhang, R., & Volkow, N. D. (2019). Brain default-mode network dysfunction in addiction. *Neuroimage, 200*, 313–331. https://doi.org/10.1016/j.neuroimage.2019.06.036

Zhao, J., Gao, S., Wang, J., Liu, X., & Hao, Y. (2016). Differentiation between two healthcare concepts: Person-centered and patient-centered care. *International Journal of Nursing Sciences, 3*, 398–402.