

# Drug-Induced Body Disownership

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## 1. The phenomenology of body ownership

Focus your attention on your right hand. Are you aware that this hand is your own? There is a sense in which this question is trivial: in so far as you know this hand to be yours, and can readily judge that it is yours, you are aware that it is. But the question becomes less trivial if the relevant notion of awareness is taken to be experiential. As you focus your attention upon your hand, you might notice a variety of sensations, such as sensations of resistance and texture if it is resting against a surface, or perhaps a sensation of temperature. But is there, among these bodily sensations, a distinctive experience of the hand as your own? More generally, do you ever have an experience of your body as your own distinct from judging that your body is your own?

This question occupies the philosophical debate on the phenomenology of body ownership, which refers to the “phenomenological quality that [a] body part appears to be part of one’s body” (Martin, 1995, p. 269). Realists about the phenomenology of body ownership argue that such phenomenology exists, and may even be pervasive in ordinary conscious experience. Here is how de Vignemont, one of the main proponents of the realist view, summarizes her position:

[W]e have a primitive nonconceptual awareness of body ownership, which is over and above the experience of pressure, temperature, position, balance, movement, and so forth.

de Vignemont (2018, p. 13)

As a claim about phenomenology, the realist view should be supported by introspection in principle. However, there is no shortage of skepticism regarding this claim. Thus, antirealists deny that there is a phenomenology of body ownership over and beyond bodily sensations and judgements of ownership. Bermúdez, one of the main proponents of the antirealist view, presents his position as follows:

There are facts about the phenomenology of bodily awareness (about position sense, movement sense, and interoception) and there are judgements of ownership, but there is no additional feeling of ownership.

Bermúdez (2011, p. 167)

Introspective disagreements are famously delicate to arbitrate, as they often lead to seemingly intractable disputes in which it is difficult for both camps to find common ground. If realists were correct, for example, could they ever convince antirealists by finally getting them to notice the target phenomenon in their experience? The realists might hope that the antirealists' failure to notice a phenomenology of body ownership in their experience is merely a consequence of the relative ubiquity and elusiveness of such phenomenology. If the relevant phenomenal feature is always or almost always present in the background of one's stream of consciousness, then it is perhaps not surprising that it proves so difficult to notice.

This assessment relies on the assumption that specific phenomenal features are easier to notice in one's experience when the cases in which they are present can be contrasted with cases in which they are missing. Indeed, most of the debate regarding the existence of a phenomenology of body ownership has focused on a specific class of arguments, namely arguments from *phenomenal contrast* (de Vignemont, 2020). Such arguments purport to show that the best explanation of the phenomenal contrast between two experiences is the hypothesis that one involves a specific phenomenal feature that the other lacks.

Arguments from phenomenal contrast in favor of the realist view have focused mainly on psychopathology and bodily illusions. Among psychopathological conditions, the discussion centers mostly on somatoparaphrenia, a monothematic delusion characterized by the patients' denial that one of their body parts is really theirs (Vallar & Ronchi, 2009). For example, patients affected by somatoparaphrenia might say of their own right hand that it is not theirs, and even that it belongs to somebody else. On the realist view, the discrepancy between reports from healthy individuals and from somatoparaphrenic patients about the relevant body parts reflects a difference in phenomenology, which is best explained by the hypothesis that the former, but not the latter, experience a sense of body ownership over these body parts.

Among bodily illusions, much attention has been devoted to the rubber hand illusion, in which a participant's real hand is placed out of view and stroked concurrently with a visible fake hand, prompting them to report feeling as if the fake hand was their own, but only when the stroking of both hands is synchronous rather than asynchronous (Botvinick & Cohen, 1998). Realists argue that the discrepancy between reports obtained from participants in the synchronous and asynchronous stroking conditions, respectively, reflects a difference in phenomenology, best explained by the hypothesis that the former, but not the latter, elicits a sense of body ownership over the fake limb. This is taken to provide further evidence that there is a phenomenology of body ownership, that such phenomenology can be elicited over a fake body part in specific illusory conditions, and that it is part of normal bodily experience in ordinary conditions – at least for healthy individuals.

The evidential strength of reports from bodily disorders and bodily illusions is the subject of an ongoing debate between realists and antirealists. Antirealists maintain that such reports cannot be confidently interpreted as offering evidence for a clear phenomenal contrast, whose best explanation requires appealing to a phenomenology of body ownership. This worry is sustained by several features of the rel-

evant conditions. For example, there is significant disagreement over the etiology of monothematic delusions like somatoparaphrenia. One debated issue is whether reports expressing delusional beliefs, such as reports of body disownership from somatoparaphrenic patients, can be straightforwardly related to specific anomalous experiences. Similarly, the face-value interpretation of reports about the rubber hand illusion obtained from questionnaires have been called into question. Indeed, it is not obvious that a moderately higher average score on the item “I felt as if the rubber hand were my hand” in the synchronous stroking condition, compared to the asynchronous condition, is indicative of the occurrence of a phenomenology of body ownership. Alternative explanations have been proposed, on which such reports reflect a mental exercise of imagination (Alsmith, 2015), or can be readily explained by appealing only to proprioceptive and tactile differences between the two conditions (Wu, forthcoming). Furthermore, there is a potentially controversial leap from the claim that a phenomenology of body ownership can be elicited over a fake limb in illusory conditions, to the hypothesis that such phenomenology pervades ordinary bodily experience.

These skeptical concerns should motivate realists to seek additional cases of phenomenal contrast that may be more difficult for antirealists to explain away. In what follows, I will discuss an alternative set of cases that seem highly relevant to the debate over the existence of a phenomenology of body ownership, although they have been neglected so far. These pertain to anomalous bodily experiences induced by several psychoactive compounds. Indeed, many drugs can trigger a remarkably wide variety of bodily effects that have received little attention in philosophy, despite their relevance to discussions about bodily awareness (see Millière, forthcoming, for a review). Interestingly, some of these effects elicit reports of disownership strikingly similar to those found in psychopathologies like somatoparaphrenia. As such, they are ripe to serve as the basis for an argument from phenomenal contrast in favor of the realist view, while being arguably less vulnerable to antirealist concerns. My aim is not to take a definite stance regarding the correct interpretation of the relevant cases, which remains open for discussion. Rather, I will more modestly present available evidence regarding these cases, and discuss the relative merits and limitations of a realist interpretation. This brief discussion aims to illustrate how debates about the phenomenology of body ownership, and body awareness more generally, may benefit from the considerations of drug-induced states as additional data points.

## 2. Arguments from phenomenal contrast

Arguments from phenomenal contrast have a long history in analytic philosophy, although the label was recently introduced by Siegel (2007). Such arguments are generally used to arbitrate introspective disagreements regarding the existence of a specific kind of phenomenology. First, readers are prompted to consider two experiences  $E_1$  and  $E_2$ . From there, the argument proceeds in two steps:

1.  $E_1$  and  $E_2$  differ with respect to their phenomenal character (i.e., what it is like to have them).
2. The best explanation of the phenomenal contrast between  $E_1$  and  $E_2$  is that one experience involves a phenomenal feature  $F$  that the other lacks.

In turn, this is taken to be evidence for the existence of phenomenal feature  $F$ . Arguments from phenomenal contrast have been widely used in two recent debates in philosophy of mind, namely the debate on the existence of a *sui generis* cognitive phenomenology,<sup>1</sup> and the debate over whether high-level properties (such as the property of being a pine tree) are represented in visual experience.<sup>2</sup>

Within the debate on the existence of a phenomenology of body ownership, de Vignemont has developed several arguments from phenomenal contrast in favor of the realist view.<sup>3</sup> Her main argument, which has become central in the literature, relies on clinical descriptions of the monothematic delusion known as somatoparaphrenia (denial of ownership of a body part, such as a limb). The argument aims to establish that there are some cases in which the normal phenomenology of ownership over a particular limb may be missing.

It is worth noting that arguments from phenomenal contrast generally seek to establish the existence of the target phenomenal contrast (in support of the first step) either by prompting readers to notice the contrast directly in their own experience,<sup>4</sup> or by prompting them to imagine what the contrast would be like based on similar experiences they may have had.<sup>5</sup> However, arguments for the existence of a phenomenology of body ownership rely instead on third-person reports – either from healthy volunteers in experiments or from patients – regarding unusual experiences that most people have never had. Readers must rely on these reports, rather than on their own past or present experiences, both to ascertain the existence of a phenomenal contrast between the two compared conditions (first step) and to determine what this phenomenal contrast consists in (second step). This peculiarity raises specific challenges, because the interpretation of the relevant third-person

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<sup>1</sup>See Chudnoff (2015), Horgan and Tienson (2002), Siewert (1998), and Strawson (1994).

<sup>2</sup>See Siegel (2007, 2010) and Bayne (2009). In this particular case, the argument from phenomenal contrast is supplemented by the additional assumption that any difference in phenomenal character between  $E_1$  and  $E_2$  reflects a difference in representational content.

<sup>3</sup>de Vignemont (2007, 2013, 2018, forthcoming).

<sup>4</sup>For example, Horgan and Tienson (2002, p. 523) prompt readers to read or say the sentence “Time flies” either “as a cliché about the passage of time [or] as a command at the insect races”. The reader is intended to notice the putative phenomenal contrast between these two conditions for themselves. Horgan and Tienson subsequently argue that the relevant phenomenal contrast is best explained by a difference in cognitive phenomenology.

<sup>5</sup>An early example of this kind of argument is offered by Strawson (1994, pp. 5-13), who prompts readers to imagine the difference between the overall experience of a monoglot Frenchman and that of a monoglot Englishman as they listen to the same news in French. Strawson argues that there would be a phenomenal contrast between the two experiences, and that it would be explained by the presence of a phenomenology of understanding in the Frenchman’s experience, but not in the Englishman’s experience.

reports is often controversial even when it is constrained by behavioral and physiological evidence.

There is a further issue with arguments from phenomenal contrast that seek to establish that the relevant difference consists in the *lack* of a specific phenomenal feature in the target experience, which is in turn assumed to be present in ordinary experience. Whenever such an argument is deployed, it is generally possible to interpret the evidence differently, by arguing that the target experience involves an *additional* phenomenal feature that is lacking in the contrasted experience. Following Billon and Kriegel (2015), I will call the former approach the *something missing* strategy, and the latter approach the *something extra* strategy. A good example of these two approaches is provided by recent debates regarding schizophrenic thought insertion. The mainstream account of thought insertion is an instance of the *something missing* strategy. On this view, the contrast between instances of thought insertion and instances of normal thinking is best explained by the hypothesis that thought insertion involves a *lack* of the sense of agency or some other phenomenal feature that is supposed to be otherwise present whenever one thinks.<sup>6</sup> However, it has recently been argued that the experience of thought insertion may not consist in the *lack* of a phenomenal feature that is otherwise present, but rather in the *presence* of an additional phenomenal feature that is otherwise absent, namely a feeling of alienation or estrangement vis-à-vis one's thoughts (Billon & Kriegel, 2015; Parrott, 2017). Importantly, the challenge of arbitrating between the *something missing* and the *something extra* interpretations of thought insertion is by no means straightforward. Patient reports can be interpreted in both ways, and there is no agreement on whether behavioral, physiological and neuroimaging data favor one interpretation over the other.

A similar challenge faces arguments that build upon reports of body disownership to defend a realist account of body ownership. This issue is particularly salient in discussions of somatoparaphrenia. On the *something missing* interpretation favored by realists, the experience of somatoparaphrenic patients lacks the phenomenology of body ownership (over a particular limb) that is otherwise present in the experience of healthy individuals. However, instead of *lacking* a phenomenal feature present in the experience of healthy controls, their experience could involve an *additional* phenomenal feature that healthy controls lack. This is the *something extra* interpretation: the experience of somatoparaphrenic patients involves an unusual experience of alienation or estrangement (with respect to a particular limb) that is otherwise absent from the experience of healthy individuals.

Unfortunately, given the sparsity and ambiguity of available reports from patients, it seems difficult to resolve the conflict between *something missing* and the *something extra* interpretations of the contrast in the case of somatoparaphrenia. It is also worth noting that the language typically used to describe this pathology in the clinical literature lends itself to *something extra* interpretation (e.g., "a sense of

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<sup>6</sup>See for example Frith (1992), Gallagher (2004), Peacocke (2008), and Stephens and Graham (1994).

estrangeness [*sic*] towards contralesional body parts”, in Vallar and Ronchi, 2009, p. 543). While a detailed discussion of somatoparaphrenia lies beyond the scope of the present chapter, these concerns illustrate typical issues faced by arguments from phenomenal contrast in favor the existence of a phenomenology of body ownership. They also strengthen the need to look for alternative sources of evidence in this debate, beyond delusions characterized by a handful of terse reports. As we shall see, some drug-induced experiences are worthy of consideration to make further progress on this issue.

### 3. Reports of drug-induced body disownership

Many psychoactive drugs are known to produce dramatic alterations of conscious experience, which include in many cases alterations of bodily awareness (Millière, [forthcoming](#)). In particular, three pharmacological classes of drugs are known to produce very strong bodily effects: classic psychedelics, dissociative anesthetics, and kappa opioid agonists.<sup>7</sup> These classes are characterized in terms of the receptor binding mechanisms mediating the subjective effects of the drugs within each class (table 1).<sup>8</sup> Interestingly, there is converging evidence that some drugs within each class may induce subjective effects described as a loss of ownership over one’s limbs or one’s whole body.

Pharmacological class	Examples of drugs	Main receptor binding mechanisms
Classic psychedelics	Mescaline, psilocybin, LSD, DMT	Agonism of serotonin 2A receptors
Dissociative anaesthetics	Ketamine, DXM, MXE	Antagonism of NDMA receptors
Kappa opioid agonists	Salvinorin A	Agonism of kappa opioid receptors

Table 1: Three classes of psychoactive drugs

Early studies on the effects of mescaline (a psychedelic molecule found in various South American cacti such as *Peyote*) already described alterations of bodily

<sup>7</sup>Kappa opioid agonists lack a common name. Although they are occasionally described as dissociative hallucinogens or atypical psychedelics, these labels can be confusing given that their receptor binding profile is very different from both classic psychedelics and dissociative anesthetics.

<sup>8</sup>Psychoactive drugs can act either as *agonists* or as *antagonists* of specific types of receptors in the brain. A given molecule acts as an *agonist* for a certain type of receptor if it fully activates the receptor that it binds to (somewhat like a key opening a lock), while a molecule acts as an *antagonist* for a certain type of receptor if it binds to the receptor but does not activate it, and can block the activity of other agonists for the receptor (somewhat like a key obstructing a lock without opening it). Both agonism and antagonism of specific receptor types can have large-scale cascade effects on brain activity and connectivity, which in turn may be associated with significant subjective effects.

experience that seem to pertain to the sense of ownership over one's body. In an influential monograph on mescaline in which he described the results of his self-experimentation, the German psychiatrist Kurt Beringer reports such an experience in remarkable detail:

[M]y own body had become completely foreign to me, no longer belonged to me, was somewhere where I wasn't at all. Opening my eyes and looking at my body did not change this experience. Bodily sensations were no longer *my* sensations. My body sensations somehow lacked the 'me' quality [*Ich-Qualität*]. When I looked at my hand, it no longer belonged to me. When I brushed my forehead with my hand, it was an indescribably strange experience: I felt the touch itself, and yet it was as if I had not touched *myself* at all. But it wasn't like touching a foreign object: the experience of touching *itself* didn't belong to me in the same way as it would in a normal state. Even when I touched the wall, this indescribably strange feeling was there. It was a very impressive experience for me that I could send an impulse of will into my arm, and yet not perceive the resulting movement as mine.

Beringer (1927, pp. 313-314, my translation)

Beringer's report is strikingly specific compared to those typically obtained from somatoparaphrenic patients (e.g., "How am I supposed to know whose hand is this? It's not mine", Gandola et al., 2012, p. 1176). Instead of reporting the delusional belief that his body was no longer his own while he was intoxicated with mescaline, Beringer explicitly describes something missing in bodily sensations, and clearly characterizes what is missing as a quality of "mineness" (*Ich-Qualität*) in virtue of which such sensations "belong" to oneself.

One can find echoes of Beringer's experience in many recent self-reports regarding the effects of various psychoactive compounds. Consider, for example, the following reports selected from a curated database of descriptions of drug-induced experiences:<sup>9</sup>

I was aware of "my" body, but in a different way [...]. It was something like my "I" was floating in the body, seeing through the eyes in that unusual way... but there wasn't the normal sense of being the body.

Compound: salvia | Report #2160

I became confused over the legs sprawled out in front of me (my own legs), and kept asking things like "Whose legs are those?", "Are those my legs?" "Are those my legs or my arms?" I then began slapping my foot and asking, "Whose foot is that? Why is that hand slapping that foot?" I was completely disassociated from my own body and confused by the body that stretched out before me.

Compound: salvia | Report #51866

When hunger occurred, I talked about the sensation as if it were happening to someone else. I repeated things such as "my body must be hungry" [...]. I

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<sup>9</sup>Reports retrieved from <https://erowid.org/experiences>. For each report, the drug used and the unique report number are indicated.



felt release from my physical body and came to a realization that I am not my body.

Compound: psilocybin | Report #44429

I look at my arm, and I feel it's not part of "myself". I attempt to pull my skin off, but not in a deliberately hard or violent way. [...] As I tugged on my skin, I did feel sensation, yet I still felt that it wasn't "me". Me was lost.

Compound: LSD | Report #97287

These reports, among many other similar ones, present several interesting characteristics. One is the use of scare quotes around the first-person pronoun, presumably to emphasize the unusual nature of the perceived relationship between subjects and their own bodies. Another is the subjects' insistence that they could still perceive bodily sensations, such as hunger or touch, yet failed to identify with the body in which these sensations were felt to occur. Finally, several of these reports explicitly describe these experiences of alienation from one's body as the *loss* of an aspect of ordinary bodily awareness – "the normal sense of being the body", as one subject puts eloquently it. These details lend credence to a realist interpretation of the reports, at least if taken at face value.

One might object that such reports are anecdotal, and not obtained in controlled experimental conditions. The first concern would apply more strongly to reports from somatoparaphrenic patients, often much shorter and less specific in their characterization of body disownership. The second concern warrants taking a closer look at consistent evidence from laboratory studies of similar drugs. Recent neuroscientific studies generally use standardized questionnaires to assess the subjective effects of psychoactive compounds. The most widely used questionnaire is Adolf Dittrich's Altered States of Consciousness (ASC) questionnaire (Dittrich, 1975, 1996, 1998) and its variations, the OAV questionnaire (Bodmer et al., 1994) and the 5D-ASC questionnaire (Dittrich et al., 2006, 2010). The Secondary Scale of the original ASC questionnaire included the item "Parts of my body seemed no longer to belong to me". Unfortunately, subsequent versions of the questionnaire do not include this item, and individual ratings for this item in studies using the original questionnaire are not publicly available. A psychometric evaluation of the OAV questionnaire with a large sample size obtained by pooling data from 43 studies revealed that items were clustered in 11 factors, including a factor related to 'disembodiment' (Studerus et al., 2010). However, items clustered in the 'disembodiment' factor seem to be more related to the loss of bodily awareness than to the loss of body ownership. Another widely used questionnaire, the Hallucinogen Rating Scale (HRS) (Strassman et al., 1994), contains six subscales including one that relates to 'somaesthesia'. The 'somaesthesia' subscale of the HRS contains, among others, the items "Body feels different" and "Feel removed, detached, separated from body". Scores on the 'somaesthesia' subscale of the HRS after intake of Salvinorin A, psilocybin, DMT, ketamine and DXM are represented in fig. 1. For each of these drugs, the scores on the 'somaesthesia' subscale were very significantly higher than with placebo. Although these drugs clearly affect bodily experience, it is difficult to



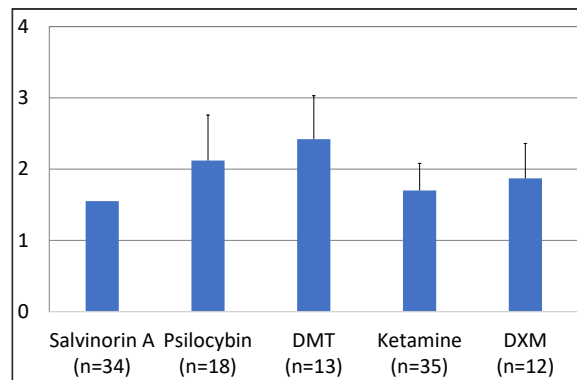


Figure 1: Scores on the ‘somaesthesia’ subscale of the HRS

(Data from Albertson and Grubbs (2009), Griffiths et al. (2011), Krupitsky et al. (2002), Reissig et al. (2012), and Strassman et al. (1996))

draw a firm conclusion from these ratings to determine whether the relevant drugs disrupt the phenomenology of body ownership putatively present in normal experience. In particular, these reports are not specific enough to arbitrate between the *something missing* and the *something extra* interpretations of the phenomenal contrast between bodily experience in drug-induced states and in the ordinary wakeful state.

Interestingly, a few studies have performed qualitative analyses of free reports obtained after the administration of a drug in a controlled environment. Thus, Addy et al. (2015) found that 20% of participants reported feeling disconnected from their bodies after intake of Salvinorin A (a kappa opioid agonist naturally occurring in the plant *Salvia divinorum*). Maqueda et al. (2015) also collected free written reports in addition to questionnaire reports, and found that high doses of Salvinorin A induced a transient “loss of sense of body ownership” (p. 9). Unfortunately, these free reports are not detailed enough to support a strong argument from phenomenal contrast.

#### 4. The bodily effects of DMT

To address the limitations of questionnaires, a recent placebo-controlled neuroimaging study on the effects of N,N-Dimethyltryptamine (DMT) included in-depths interviews with each participant (Timmermann et al., 2019).<sup>10</sup> DMT is a psychedelic compound naturally occurring in a variety of plants such as *Mimosa tenuiflora*, with short-lasting (15 to 20 minutes) but powerful subjective effects. Participants were administered the drug intravenously while lying down with an eye mask. Each participant was subsequently interviewed for one hour, soon after the effects of the drug had completely subsided. The semi-structured interviews followed a method known

<sup>10</sup>I personally conducted these interviews as a co-author of the study. Anonymized excerpts are quoted below with permission from the first author, Christopher Timmermann.

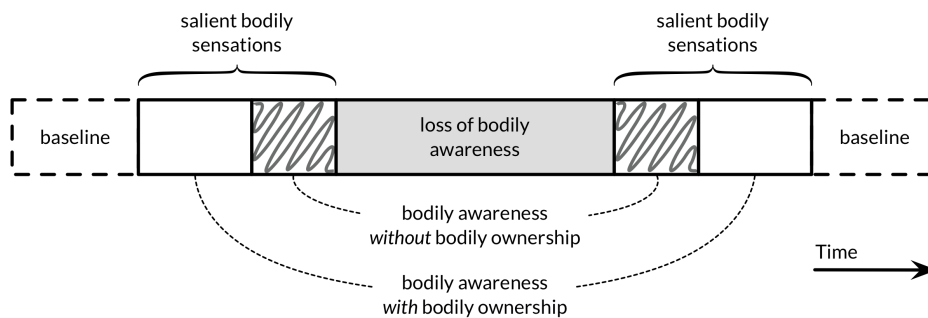


Figure 2: A model of the bodily effects of DMT

as microphenomenology, designed to obtain fine-grained descriptions of subjective experience while minimizing the risk of confabulation (Petitmengin, 2006).

All participants described an experience with a similar temporal structure. One of the first effects of the drug, a few seconds after administration, was the occurrence of salient bodily sensations of pressure, vibration, and/or warmth. Participants described the gradual appearance of visual hallucinations of increasing complexity soon afterwards. As the visual hallucinations became immersive and three-dimensional, a few minutes after administration, most participants reported completely losing awareness of their bodies for several minutes, then gradually regaining awareness of bodily sensations when the effects of the drug started to wane.<sup>11</sup>

A number of participants described in some detail the transition phases leading respectively to the loss and retrieval of bodily awareness. Interestingly, these descriptions suggest that both transition phases included a brief period during which participants no longer experienced their bodies as their own.

One interpretation of these reports is that participants first had bodily sensations associated with a phenomenology of body ownership, then lost the phenomenology of ownership over these bodily sensations, and finally lost bodily sensations themselves; and conversely when the effects of the drug subsided, they first regained bodily sensations without a phenomenology of ownership, then also regained this phenomenology (fig. 2).

One participant (subject 6) described the initial transition phase leading to the loss of bodily awareness as follows:

[T]his was kind of the intermediate point... and then in that moment [I remember] maybe having a sensation in my toes or my hands but they didn't really feel like they were a part of me. And then I was just completely somewhere else and there was no sensation of body anymore, I completely lost that.

<sup>11</sup>By *bodily awareness*, I refer to any kind of bodily experience, including any bodily sensation and the putative phenomenology of body ownership. Furthermore, I take it that the phenomenology of body ownership, if it exists, is always attached to specific bodily sensations, and thus cannot occur in isolation from such sensations (see also de Vignemont, 2018)

Another (subject 12) described this transition as involving a bodily sensation – an intense sensation of pressure – but insisted that in having this sensation she was not aware of her body as such:

I do feel the intense pressure on me. And I don't have any awareness of my body at all... [I]n every single cell of my body I feel pressure, but I didn't feel my body, I just felt pressure... I can't really say where I felt the pressure.

Several participants described in rich detail the parallel transition phase that occurred as they regained bodily sensations, insisting on the fact that these bodily sensations were not experienced in the usual way at first. Descartes famously wrote that one is not lodged in one's body like a pilot in a vessel;<sup>12</sup> for a few minutes, one participant (subject 3) felt precisely the opposite as he was recovering awareness of his body:

[T]hen what happened was I became aware of my body again... I had a body but I felt like a limp puppet... It is as if I had a sign on me saying "The doctor has left the building". Because it's like my body was just this kind of husk, and I was looking down almost with a sense of amusement of "look at that, look at that body!" (I wasn't [actually] looking at myself – I certainly wasn't looking down on the bed... – but I was aware that I was in my body). So it's like a return to my body. But my sense of self was separate. That's interesting isn't it? So I guess I have this profound sense of my consciousness and sense of self being stuck in this kind of husk... The body is one thing, and me is something else. I kind of felt like this useless puppet and it was kind of amusing. It was like 'you can do what you want. Stab me. Take my blood. Whatever...' [I]t's like my consciousness had been shrunk and to a little tiny point, I was aware of myself inside this body... It felt like a sort of useless lump of flesh... It sort of felt like a vehicle that was carrying me around. I was aware that my self... was being carried around by this vehicle. And I could see it as a vehicle. It felt like a vehicle it felt like a machine in which I live sort of thing. It's like this is my house. This physical lump of flesh and my self... was something else... [I]t was sort of amusing that I was aware of my self... as residing in a body but dissociated from it.

This description is intriguing, because it suggests that the participant was aware of being inside a body ("that body"), and had abstract knowledge of this body being his own,<sup>13</sup> although he did not experience his body as his own – at least for the few minutes during which he first regained awareness of his body, before the effects of the drug completely subsided.

The same subject also described the experience of being back into his body without experiencing his body as he normally does by using the metaphor of being in a car. When one is in a car, one feels located in it, and one may have abstract knowledge that one owns the car, but one presumably does not have a distinctive feeling of

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<sup>12</sup>Descartes, *Meditations on First Philosophy*, VI.

<sup>13</sup>In the context of the report, I am inclined to interpret the phrase "I was aware that I was in my body" in an epistemic sense. On this interpretation, the participant had abstract knowledge that the body in which he felt located as in a 'husk' was his body, although it did not feel like his body.

ownership of the car. The participant specifically insisted on his disconnection from what was being done to his body during this phase of the experiment, as scientists were taking blood samples:

Imagine if you've taken your car to the mechanics... and you had all these mechanics milling around, undoing the wheels, going under the bonnet, and you're in the car. It felt like that. [I was] sitting in my body as a sort of observer watching them mill around, pull bits... I felt as if I was in a machine, as opposed to [how one feels] normally... If you prod my arm today, now... you're prodding me. But then you weren't prodding me. You were prodding the machine. I was somewhere else. My soul was just in there.

Another participant (subject 11) also described the phase transition that occurred as he was regaining awareness of his body in terms that suggest that something was initially missing from the way in which he was aware of this body:

Then the next stage would be when I was starting to become aware of myself again... it's kind of wrong to say 'I', because it wasn't like that, it was more like my body started to have sensations again...

The evidence provided by these reports in support of the realist view seems somewhat more compelling than the evidence provided by available reports of somatoparaphrenia. To begin with, there is little doubt that there is a phenomenal contrast between the bodily experience described in these reports and the bodily experience of sober subjects. Unlike somatoparaphrenic patients, these healthy participants were not delusional, and it is implausible that they all confabulated about their unusual bodily experiences.

But are there better explanations of the phenomenal contrast that are not committed to the realist view? A *something extra* strategist might argue that the reports describe an *additional* feeling of disownership or alienation from one's body, rather than the lack of a pre-existing feeling of ownership. Admittedly, there is nothing incoherent about a theoretical account in which the intermediate phases of bodily awareness without body ownership were described as experiences of sensations in a body that seemed positively alien. Nevertheless, there are several details a realist could rely on to argue that the *something missing* interpretation offers a superior explanation of the reports.

Firstly, reports describe the transitions surrounding the peak of the experience in a nicely symmetrical manner. The first transition is described as the gradual *loss* of some features of normal bodily experience, while the second transition is described as the gradual *retrieval* of these features. This symmetrical structure is coherent with the *something missing* interpretation, according to which the phenomenology of body ownership first goes missing during the initial transition towards the loss of bodily awareness, and is then regained during the second transition towards normal bodily experience (fig. 2).

Secondly, reports describe each transition as relatively linear. The first transition gradually progresses from salient bodily sensations to a complete loss of bodily

awareness, while the second transition gradually progresses from the lack of bodily awareness to normal bodily experience. If the *something extra* interpretation was correct, then neither of these transitions would be linear. The first transition would involve the emergence of an additional feeling of disownership towards bodily sensations before leading to the abrupt loss of both this additional feeling and the bodily sensations themselves. As for the second transition, it would progress from the lack of bodily awareness to the reappearance of bodily sensations plus an additional feeling of disownership, and then to the loss of this additional feeling. By contrast, the *something missing* interpretation fits well with the seemingly linear nature of the transitions described by the reports. Furthermore, this interpretation is also consistent with the relationship between the pharmacokinetics of the drug and the evolution of its subjective effects. For example, one might expect a gradual return to ordinary bodily experiences as the plasma concentration of the drug decreases.

A few additional considerations suggest that this new argument from drug-induced disownership might prove more compelling than previous phenomenal contrast arguments in favor of the realist view. As I have already mentioned, reports are obtained from healthy participants rather than delusional individuals, and as such are more trustworthy. Furthermore, the contrast condition is short and reversible, and can thus be easily compared to the control condition (i.e., placebo). Finally, and perhaps most importantly, detailed and explicit reports from in-depth interviews are available. These fine-grained descriptions focus specifically on the phenomenology of the drug-induced state, thus providing a rich source of evidence for the argument. By contrast, such detailed phenomenological descriptions are sorely missing in the literature on somatoparaphrenia and other relevant psychopathologies.

While these considerations are rather compelling, the case for the realist interpretation of these reports should not be overstated. More evidence is needed, particularly from controlled studies, to develop a clearer picture of the specific ways in which bodily awareness may be altered under the effects of various drugs, including DMT. One major issue in the interpretation of phenomenal contrasts associated with the transient effects of psychoactive compounds is that they often affect bodily awareness in ways more than one. As we have seen, DMT induces anomalous bodily sensations (e.g., pressure, vibration, and warmth); and, at the peak of the experience, it may suppress bodily awareness altogether. Disentangling these effects from the presumed loss of body ownership is not straightforward. This certainly falls short of the ideal case for phenomenal contrast arguments, which would involve minimal pairs of experiences that only differ with respect to a single phenomenal feature (Koksvik, 2015). It should be noted, however, that this criticism would apply equally strongly to many other arguments from phenomenal contrast discussed in the literature, including the argument from somatoparaphrenia.

## 5. Conclusion

Does ordinary bodily experience involve experiencing one's body as one's own? Realists about the phenomenology of body ownership argue that it does. On their view, appealing to the existence of such phenomenology in ordinary experience provides an elegant explanation of several illusory and pathological conditions. Whether this kind of explanation is plausible is the subject of an ongoing debate. I argued that this debate could benefit from considering a broader range of cases in which subjects report a disturbance of body ownership. In particular, I reviewed heretofore neglected evidence from drug-induced states that seem *prima facie* consistent with the realist view. Indeed, some experiences triggered by psychoactive compound can cause subjects to report losing the sense that their body is their own. Taken at face value, these reports lend themselves to a realist interpretation, according to which the best explanation of the phenomenal contrast between bodily experiences in the ordinary wakeful state and in intoxicated states is that only the former involve a phenomenology of body ownership.

While this interpretation is not ironclad, drug-induced experiences of disownership do provide welcome additional evidence in the debate between realists and antirealists. Furthermore, they are usually described in rich detail, compared to ambiguous questionnaire ratings or clinical interviews, and they do not seem typically associated with delusional beliefs that complicate the interpretation of reports. Disruptions of bodily awareness induced by psychoactive compounds are typically short and reversible, and can be relatively safely studied in placebo-controlled experiments. Future research should investigate the full range of effects that various compounds may have on bodily experience, and attempt to disentangle supernumerary bodily sensations from the loss of components of ordinary bodily awareness. In particular, further evidence regarding reports of drug-induced disownership could potentially arbitrate between *something missing* and *something extra* interpretations at the heart of the disagreement between realists and antirealists.

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