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## Ten problems of bodily ownership

Frédérique de Vignemont

The body is a material entity located in space and time in the same way as a rock, a tree or a bird. But do we perceive and experience our body like those other objects? Most philosophical interest for bodily awareness has come from its peculiarities. It is precisely because we assume that we are aware of our body differently from other objects that it raises many questions. But what makes it unique? The most intuitive answer is that it bears a special relation to the self, and to self-awareness. Yet, although introspectively familiar, it is hard to exactly pinpoint the nature of this specific relationship. Thanks to their privileged relation to our body, bodily experiences seem to afford awareness of our body *as being our own*, what has been called the sense of bodily ownership, for want of a better name.<sup>1</sup> In my book, *Mind the body* (2018), I explored what it takes to be aware of one's body as one's own but I had to face a number of issues, many of which are still unresolved, and since then, new ones have raised. The aim of this chapter is to offer a very brief outline of the main questions and puzzles that await those interested in bodily ownership. I have picked ten of them, to echo Michael Tye's famous *Ten problems of consciousness*, but there are many more, I am afraid, and each problem raises major issues that deserve much more than the space allocated here.

### 1. The problem of the first-person

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<sup>1</sup> Here I focus on external parts of the body and leave aside internal organs. We feel internal sensations but we ascribe them to specific viscera only at the cognitive level, and even sometimes we fail to do so (we can easily confuse a kidney pain with a back pain, for instance). It is thus not clear whether we experience a sense of ownership toward our viscera.

What is the difference between seeing and feeling one's legs being crossed? One could say that vision gives access to many legs besides one's own whereas proprioception is self-specific: it does not give information about any other legs than one's own. Because of this difference, one can be mistaken about whose legs one sees, but not about whose legs one feels. In more technical terms, proprioception along other ways of gaining information about the body from the inside (touch, pain, interoception, etc) ground bodily self-ascriptions that are immune to error through misidentification relative to the first-person (Evans, 1982; Vignemont, 2012). This difference between vision and proprioception is epistemic. It concerns the type of knowledge the sensory experience can ground. There is also a phenomenological difference. Merely seeing one's legs does not make one experience them as one's own. One can believe that they are one's own but this is not the same as to have a sense of bodily ownership toward them. Only when one experiences one's body from the inside does one experience one's body *as one's own*. But what is at the source of this first-personal character of bodily experiences?

One may simply suggest that when one feels one's legs crossed, not only does one proprioceptively experience one's posture, but one also experiences a primitive irreducible feeling of 'mineness' (Billon, this volume). This proposal offers an account for the first-personal character of the sense of ownership but it may seem to presuppose what it is supposed to explain. We want to know where this mineness comes from. One can then adopt the opposite strategy and reduce the first-personal character to some non-first-personal features, and more particularly spatial features of bodily experiences (Martin, 1995; Bermudez, 2017). According to this reductionist approach, one experiences nothing more than somatosensory properties, such as posture, temperature, pressure, and so forth, located in one's body. The proposal, however, is that these properties are experienced in such a way that one is necessarily aware that they are properties of one's body *qua* one's own. But is that really the case? As Peacocke (2017, p. 292) notes:

The content this leg is bent, even based on proprioception, or capacities for action with the leg, or both, is not yet the content my leg is bent [...] What more is required?

The challenge is thus to find a way to account for the transition from “this leg” to “my leg” without begging the question, one way or another. It is difficult to find a path that avoids the risk of either giving a circular account or no account at all. One solution may then be to explain the awareness of one’s body as one’s own (*my body*) by appealing to other types of experiential relation to the self, such as mental properties (the body that *I feel*), agentic properties (the body *under my control*), or affective ones (the body that *matters to me*). These various options then presuppose that one already has some self-referential abilities and the sense of bodily ownership only borrows, so to speak, the first-person from them.

## 2. The problem of feeling

Does one actually feel one’s body as one’s own or does one only entertain the thought that it is one’s own body? The notion of a *sense* of ownership is ambivalent. You may claim that you have the sense that tomorrow will be a great day or that you have failed your exam. It then refers to your intuition, something like a conceptual non-reflective awareness. Likewise, one may argue that ownership is only something that one can conceptually represent. As Bermudez (2011, p. 167) claims: “there are judgments of ownership, but there is no additional feeling of ownership” (see also Alsmith, 2015; Wu, forthcoming). This conception of bodily awareness finds its origin in Anscombe (1962) and Wittgenstein (1968), who both dispute the epistemic significance of bodily sensations. They argue that the use of the term ‘sensation’ can be misleading: it is not because we talk of sensations that we do have them. Instead, what we may really have are only beliefs or judgements. They conclude that we know that our legs are crossed, but not in virtue of feeling them that way. Bermudez follows up on their proposal and

claims that we know that our body is our own but not in virtue of feeling it as our own. But are we doomed to only think about ownership or can we have a non-conceptual experiential grasp of it?

One objection that has been put forward against Anscombe and her followers is that there are bodily illusions in which the body appears in a certain way to the subject, but the subject does not believe it to be this way. This is typically the case in the rubber hand illusion, in which participants report that it seems to them that a rubber hand is their own hand though they know that it is only a mere piece of rubber. At first sight, it may seem that the rubber hand illusion is like any sensory illusion. For instance, in the Muller-Lyer one, it can seem to you that two lines are of distinct length, though you know that they are of equal size. It is then generally assumed that you have a visual experience of the two lines as being different that is immune to the influence of your belief. Likewise, one may argue that participants have a feeling of ownership towards their rubber hand, which can be at odds with their judgment. One can also take the case of the patients who know that their hand belongs to them, and for whom it still seems as if it did not. A patient, for instance, claimed: ‘my eyes and my feelings don’t agree, and I must believe my feelings. I know they look like mine, but I can feel they are not, and I can’t believe my eyes’ (Nielsen 1938, p. 555). This calls to mind what one experiences when one suffers from vertigo: one can feel afraid to fall down, though one does not believe that there is an actual risk. On this experiential interpretation, one should take the patient’s words at face value when he claims not *feeling* ownership.

The problem, however, is that there are attitudes other than feelings and sensations that can be dissociated from one’s beliefs and judgements (McDowell, 2011). The question then becomes: what kind of cognitive state are we in when we have a sense of bodily ownership? What does the patient express, if not his feelings? One may also simply ask why rejecting the notion of ownership feeling. One possible reason is that ownership is a relatively high-level

abstract type property, and as such it can be only conceptually represented. This reply assumes a conservative conception of perception, according to which only low-level properties can be represented at the level of perceptual content. The conservative conception, however, has been challenged in the last ten years in favour of a richer conception of perceptual experiences. For instance, causation may seem as abstract and as complex as ownership, even if not more, and yet for some, it can be represented in visual experiences (Siegel, 2009). According to a liberal account at least, there is no principled reason for which ownership cannot be grasped in a non-conceptual manner.

### **3. The problem of body mereology**

Is it one and the same thing to experience a body part or the whole body as one's own? Or if we rephrase the question in empirical terms, do the rubber hand illusion (RHI) and the full-body illusion (FBI) manipulate the same notion of ownership? In the classic set-up of the RHI, participants sit with their arm hidden behind a screen, while fixating on a rubber hand presented in their bodily alignment; both the rubber hand and the real hand are then stroked in synchrony or not (Botvinick and Cohen, 1998). The FBI follows the same principle of visual capture of touch except that with a system of video cameras and virtual reality goggles, participants see the back of a virtual avatar being stroked while feeling their own back being stroked (Lenggenhager et al., 2007). For both illusions, multisensory integration appears to play a key role but beyond this commonality, what is the relation between self-ascribing a hand (local ownership) and self-ascribing the full body (global ownership)?

It is tempting to conceive of local ownership in mereological terms. To claim that this hand is mine simply means that it is part my body. The hand is then experienced as a part of a larger object, and the sense of hand ownership only expresses this part/whole relationship. One may then claim that local ownership results from what Bermudez (2017) calls the connectedness

principle, according to which one experiences the location of the bodily event relative to the disposition of the body as a whole. In brief, one experiences this hand as one's own because one experiences whatever happens there as being connected to the rest of the body. However, one may then ask: what makes the rest of the body one's own? There is a risk that ultimately local ownership requires global ownership if what one really experiences is (i) the hand being a part of the body and (ii) the body being one's own. One then needs to give an account of global ownership that does not appeal to local ownership to avoid a vicious circle.

Alternatively, one may claim that there is no global ownership. One may indeed ask whether we need to represent the body as a whole. Alsmith (2021), for instance, argues that it suffices to have a collection of local representations of body parts that are coordinated together. One may further claim that we only need to self-ascribe the various individual body parts to the same subject. How, then, to interpret the FBI? It could be about the full body, but only derivatively. Its primary object is the torso, which is the body part that is stimulated. The difference with the RHI, however, is that unlike the hand, the torso is articulated with many other segments of the body, including the head, the legs and the arms. Consequently, the illusion of ownership towards the torso has consequences for the whole body, but this does not mean that there is an illusion of ownership towards the whole body.

#### **4. The problem of the alien limb**

What is the relationship between the sense of ownership and the sense of disownership? What seems so obvious for us, namely, that this body is our own, is not so for some individuals with neurological or psychiatric conditions who deny ownership of one of their limbs (see Billon, this volume). One of the first cases was described in 1825: a patient said about the left side of his body that it felt 'as if it were a stranger to him; it seemed to him that somebody else's body was lying on his side, or even a corpse' (Bouillaud 1825: 64). Almost two centuries later, a

patient after a right parietal lesion described his left hand as follows: ‘I’m sure, it isn’t mine, I don’t feel it as my hand’ (Cogliano et al. 2012: 764). The questions are: what do these patients express when they deny ownership of their limbs? And what does it tell us about the sense of ownership that we normally experience?

One can first note a phenomenological asymmetry between ownership and disownership. Our body normally remains at the margin of consciousness, unless there is something wrong that happens. Patients then report a remarkably vivid and salient phenomenology associated with their sense of disownership. The fact is that our body never leaves us and it can thus become almost phenomenally transparent. In neural terms, there is a phenomenon of habituation for repeated stimuli, which become suppressed over time, and if there is one thing that is repeated, it is our own body. It has even been argued that by default, there is no phenomenology of ownership; there would be only a phenomenology of disownership (Chadha, 2018).

This asymmetry, however, is not systematic. On the one hand, when the situation is unusual, the phenomenology of ownership can become relatively strong. Consider the case of phantom limbs, for which ownership becomes relatively salient (Melzack, 1990). A soldier amputated during the Civil War, for instance, claimed about his phantom leg: “I am more sure of the leg which ain’t than of the one that are” (Mitchell, 1871, p. 566). On the other hand, one should not believe that disownership phenomenology is always very vivid. It has been found that there is a “silent” version of the disownership syndrome (Ronchi et al., 2020). Patients then do not report experiencing disownership for their left limb, and yet when they have to rate the ownership that they experience on a visual scale, the rating for the left limb is significantly lower than for the contralateral limb.

Now the question is whether the sense of disownership solely results from the lack of ownership experiences. Since it is normally relatively dim and elusive, it may seem that if the



sense of ownership goes missing, its loss may not be phenomenally immediate. Think of a painting that you have always seen on the wall in your parents' house. Most probably, when facing it, you no longer pay attention to it. And if one day the painting is gone, you may not notice it because you take it for granted, so to speak. The painting is then simply absent in your visual phenomenology but it is only when you notice that the painting is missing that you do experience its absence. Likewise, one may argue that the experience of disownership is not only the result of the loss of ownership experiences; it also requires the awareness of this loss.

## **5. The problem of degree**

Another way to conceive the relation between ownership and disownership is as two endpoints on a continuous scale. Billon (forthcoming), for instance, claims: "Mineness would come in degrees". In his view, mineness is not a discrete property. This explains the heterogeneity in the disownership experiences that patients report. This could also explain the rating that participants in RHI studies give on a quantitative scale (from -3 to 3, for instance). But what does the rating precisely mean? We need to distinguish three distinct claims:

- (i) I feel that this hand is more or less my own.
- (ii) I feel more or less intensely my hand as my own.
- (iii) I feel more or less confident that this is my hand.

Option (i) is the most counterintuitive. Arguably, the function of the sense of ownership is to track whose body one experiences. It aims at systematically co-varying with the metaphysical fact of body ownership (Dokic, 2003). Now, it is hard to conceive that a living body part could belong to a certain individual to varying degrees. It rather seems that either it is your hand or it is not. Therefore, the sense of bodily ownership should also be a matter of all or nothing: either

you experience the hand as your own or you do not. There are then two ways one can explain the variety of ratings and reports: in terms of vividness (ii) and in terms of confidence (iii).

First, body parts can be associated with a more or less intense and vivid phenomenology of ownership depending on attentional and emotional context. For instance, we can speculate that anorexic patients feel more vividly their hips as being their own than other parts of their body that are not at the core of their concerns. This might also explain why the ownership rating for the rubber hand is always less than the maximum. On some accounts indeed, one only imagines that the rubber hand is one's own (Alsmith, 2015), and as Hume famously claimed, imagination strikes our mind less clearly than perception. To be clear, a less vivid experience does not entail that one experiences the body part as as being less of one's own.

Alternatively, we can analyse the ownership rating in the RHI at the metacognitive level of confidence. When participants are asked to what extent they agree with a specific statement in questionnaires for the RHI, they may be only replying to what extent they are confident that the statement is true. Not surprisingly, they are only mildly sure whether it seems to them that the rubber hand is their hand. Their rating reflects the probability that they ascribe that this is their hand. But to experience a 0.9 or 0.3 probability that something is part of one's body is not the same as to experience that something is 0.9 or 0.3 part of one's body.

## **6. The problem of cognitive penetration**

In a recent highly debated paper, Lush and coll. (2020, p. 6) claimed that the RHI "requires" the contribution of top-down factors and that one can give a "cognitive" account of the illusion. But do we normally feel our body the way we do because of our knowledge and expectation? The issue of cognitive penetration of perception is highly debated (Firestone and Scholl, 2016; Macpherson, 2012), though rarely in the context of bodily awareness. Can ownership beliefs

influence how one experiences one's body? And if they can, what does it show about the nature of the sense of bodily ownership? It is important to distinguish several claims:

- (i) The sense of bodily ownership can be causally influenced by cognitive states.
- (ii) The sense of bodily ownership can be cognitively penetrated.
- (iii) The sense of bodily ownership requires the contribution of cognitive states.

To show that a sensory experience is cognitively penetrable, one must be able to show that two perceivers can have different experiences because of semantically-relevant differences in their respective cognitive states, while the object of perception, the perceiving conditions, the state of the sensory organ and the location of spatial attention are hold fixed. Let us now see whether we have evidence of such cognitive penetration for bodily awareness. Consider the following example. A somatoparaphrenic patient believed that her left hand belonged to her niece. She was unable to detect tactile stimulations on her 'alien' hand, unless she was told beforehand that they were going to be applied to her niece's hand (Bottini et al., 2002). Her belief thus influenced her bodily experiences, but does it penetrate it? Not necessarily. One may indeed reply that the patient's expectation that her alleged niece's hand was going to be touched directed her spatial attention to her hand, which in turn modified her tactile experiences. Hence, the location of attention was not hold fixed. Consider now the results that lead Lush and coll. to defend a cognitive interpretation of the RHI. They found that participants generated expectancies about what the illusion would feel like when the RHI set-up was only described to them (Lush, 2020). But what role do these expectancies play for the actual illusion? Lush and coll. (2020) found that manipulating them (by warning beforehand the participants what they should feel and when they should feel it) had no effect on the strength of the illusion. All they could find was a weak correlation between the strength of the illusion and the participant's suggestibility score. Suggestibility scores, however, are known to be difficult to interpret and

they may be explained by a variety of factors. Thus, it is not clear what this correlation can reveal.

Finally, it should be noted that even if there were proofs of cognitive penetration, that would still not suffice to show that cognitive factors are *necessary* to the sense of bodily ownership. Take the example of pain for which there is robust evidence of cognitive penetration (for discussion see Gligorov, 2017; Shevlin and Friesen, 2020). Many agree that pain cannot be reduced to the signals sent by nociceptors and that it can result from many factors, including expectations. Yet very few are ready to claim that pain *requires* the involvement of top-down processes.

## **7. The problem of felt location**

We just saw the case of a somatoparaphrenic patient who took her hand to be her niece's. We discussed it to analyse the impact of beliefs on the sense of bodily ownership but we should not neglect the most important fact, namely, that she was able to feel tactile sensations in her 'alien' hand. But can one really feel sensations in a limb that does not appear to be one's own? At first sight, this seems to be unconceivable (Bain, 2003; Dokic, 2003; Martin, 1995). For Martin (1992: 201), for instance, there is nothing beyond the felt location in the sense of body ownership: "when one feels a bodily sensation to have a location there is no issue over whose body it appears to belong to". Yet, for some patients at least, there seems to be an issue. Bottini's patient is not an isolated case, 5% of all the somatoparaphrenic patients that have been tested showing no somatosensory deficit (Romano and Maravita, 2019). We may also include in our list patients who suffer from depersonalisation or from peripheral deafferentation, who can still feel sensations on their body (thermal and painful ones in deafferentation), though it feels to them as if it was not their own body. More importantly, one should not forget that even a single

case can suffice to serve as a counterexample. But is there no way to save the intuitive link between the felt location of one's sensations and the sense of ownership?

One can start with questioning the content of the patients' introspective reports. Introspection is accused to be unreliable when it comes to the sense of ownership (Wu, forthcoming). Roughly speaking, patients do not know what they are talking about when they claim, "It doesn't feel like mine". But then, what are they talking about? They could be reporting only what they erroneously believe, and not what they experience. Somatoparaphrenic patients are indeed delusional: they are convinced that their hand is not their own. This interpretation, however, does not work for those, like depersonalized patients, who are aware that it is their own body and who still complained that it feels 'as if' it was not. Alternatively, one may claim that patients experience only a *partial* lack of ownership, one dimension still being preserved. Bradley (2021), for instance, grants that the patients report what they experience, but he claims that they fail to dissociate two distinct types of ownership, which he calls minimal and affective ownership. In his view, the latter is missing but the former is preserved and it is this sense of minimal ownership that is guaranteed by the felt location of bodily sensations. But what is this minimal ownership? According to Bradley (2021, p. 373), it corresponds to "one's awareness of one's own body to directly control relevant first-personal capacities", such as "motivation, withdrawal reflexes, protective dispositions, etc". The crucial question is whether those capacities truly require the first-person (Vignemont, forthcoming). For instance, one can note that most animals display protective behaviours and react to nociception (and possibly to pain). On Bradley's view, this entails that they have a sense of minimal ownership, but it seems so minimal that one may wonder whether it corresponds to the type of self-awareness that most philosophers have focused on when they discuss bodily ownership.

Now, if one grants that these patients really fail to experience ownership, one can still question whether bodily sensations are fully preserved. One may, for instance, argue that patients are not paying attention to their sensations and to their ‘alien’ limbs, and this lack of attention would explain their denial of ownership. However, adding attention may not be sufficient insofar as some patients suffer from no attentional deficit. We have to look for other differences. One may then revise the original claim as follows: when one feels a *normal* bodily sensation to have a location there is no issue over whose body it appears to belong to. One can then assert that patients do not have normal sensations. But on which basis? The challenge is to determine how to decide if a sensation is normal or not. If by normal sensation, one means reliable perception of somatosensory properties, then they can be normal in some somatoparaphrenic patients: they can experience pressure when a tactile stimulation is applied to their hand. Unless we beg the question and claim that sensations are normal only if one feels them to be located in one’s body *qua* one’s own, it seems that their sensations are normal. We thus have not solved the puzzle: why do these patients do not feel their limb as their own?

## **8. The problem of bodily control**

Some insights may be gained by considering a different type of neurological condition, namely, peripheral deafferentation (see Gallagher, this volume). One of the most studied patients, IW lost all proprioceptive and tactile information below his neck after an acute neuropathy. For the first few months, he was bedridden because he had no control over his limbs, whose posture and location was inaccessible to him from the inside. At this time, Ian reported feeling alienated from his body (Gallagher and Cole 1995). Yet he could still experience pain and thermal sensations. Again, this shows that bodily sensations may not be sufficient for the sense of ownership. What is also interesting is that with time IW regained his sense of ownership and this coincided with his regained ability to control his body. He learned to exploit visual

information to compensate for his proprioceptive loss. Looking at his limbs, he could know where they were located and thus, plan their movements. It may then seem that agency plays a key role for the sense of bodily ownership. This seems to be confirmed by the fact that disownership syndromes often involve some more or less extreme motor impairment. But what components of agency exactly? And if agency is necessary for the sense of bodily ownership, how to explain this other important fact, namely, that most patients with motor disorders still experience their body as their own?

We need to distinguish between three levels at which agency may intervene for the sense of bodily ownership:

- (i) Agentive feelings,
- (ii) Body schema,
- (iii) General agentive ability.

The challenge that the first version (i) faces is that the sense of bodily ownership can be preserved in patients who have no agentive feelings whereas it can be missing in patients who have retained agentive feelings. For example, anarchic patients report that they have no control over their limbs but they still claim that their limbs belong to them (Marchetti and Della Salla 1998). On the other hand, somatoparaphrenic patients can be unaware of their paralysis, erroneously feeling that they can control their paralyzed ‘alien’ hand, and yet they do not experience it as their own.

One might then reply that the analysis is not at the right level of explanation. The account should be in terms of unconscious sensorimotor knowledge (ii) but this is no more satisfactory. Consider the RHI. It has been shown that in some situations at least, there is no agentive contrast between synchronous and asynchronous conditions, not only at the phenomenological level (subjects report no agentive feelings toward the rubber hand, Longo et al. 2008), but also at the sensorimotor level (the way they perform their movements is not altered by the illusion,

Kammers et al. 2009). Peacocke's (2017) agency-involving account may then seem the most promising because it appeals to the notion of action at a relatively high level of generality (iii).

On his view, a subject can experience that this is her own hand if and only if:

- 1) There is a range of action notions A for which the creature must be capable of being in mental states... with the content c is A-ing where the state... is produced by the initiation of an A-ing by the reference of c;
- 2) And there is a range of notions F of bodily properties, spatial properties, and past tense properties F such that the creature is capable of being in mental states... with the content c is F; where in these attributions, c is F is accepted (in central basic cases) if and only if this body is F is also accepted. (Peacocke, 2017, 293)

One may then question which individuals, if any, do not meet these constraints. Peacocke offers only a necessary condition, and not a sufficient one. Consequently, he cannot explain why some patients that are paralyzed feel their legs as their own whereas others do not. Nor can he explain why one of the rare somatoparaphrenic patients that have no motor deficit still experiences her right upper limb as alien (Beato et al., 2010). Agency may be a precondition for ownership but there is still a lot that remains to be explained.

## **9. The problem of survival**

Agency has two fundamental functions, to exploit the world and to protect oneself from the world. Most interest has focused on the former, investigating movements such as reaching and grasping. However, when it comes to the self, the second class of movements, which are concerned by self-defence, may be more interesting. In brief, survival involves preservation of one's body. It may then seem that protective behaviours should be a good proxy for the sense of bodily ownership. At first sight, this seems to work. On the one hand, when participants



report ownership for a rubber hand, they affectively respond when a hammer threatens to hit it, as if it were their own hand (Erhsson et al., 2007). On the other hand, patients with somatoparaphrenia (or other disownership disorders) show no autonomic reaction when their ‘alien’ hand is under threat (Romano et al., 2014). Likewise, depersonalized patients do not feel concerned by the pain they experience in their ‘alien’ body. The problem, however, is that one protects many things besides one’s body and one does not always protect one’s body. What is then the relationship between protective agency and ownership?

The first thing to note is that protective agency encompasses a range of various behaviours. There are relatively high-level behaviours that result from complex decision-making, involving a variety of beliefs, desires, emotions, moral considerations, and so forth, but there are also more basic and fundamental behaviours, which are based on direct connection between perception and action. There are protective behaviours that target the body in danger (e.g., putting the burnt hand under cold water) but there are also protective behaviours that target one’s affective state (e.g. taking a pain-killer). Arguably, only basic defensive mechanisms that are body-directed are relevant for the sense of bodily ownership.<sup>2</sup> A good example is provided by the sensorimotor processing of peripersonal space. It has been found that the immediate surrounding of one’s body is encoded in a specific way to elicit protective behaviours as quickly as possible if necessary (Graziano, 2018). It thus plays the role of a margin of safety surrounding the body. We can further speculate that we have a specific representation whose function is to track the body to protect, what I call a protective body map. Hence, if a spider crawls on my hand, I feel its contact as being located within the frame of the body to protect.

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<sup>2</sup> A patient can thus deny that the limb in pain is her own and yet try to get rid of the pain because her protective response is pain-directed, and not body-directed (see Maravita, 2008 for such a case).

To fix the bodily boundaries that have evolutionary significance, the protective body map answers two questions: (i) where do the body stop, and the rest of world start? and (ii) what matters for self-preservation? I propose that there is a stage in development in which it is important, possibly even necessary, to experience pain and other negatively-loaded sensations to give affective significance to bodily boundaries, and thus to build the protective body map. Typically, pain indicates that these boundaries are the ones to care about and to protect if one wants to survive. It vividly highlights for the subject that what is inside bodily boundaries matters and if one has never experienced it, one fails to experience the body as one's own, as shown by congenital insensitivity to pain. Indeed patients that have a dramatic impairment of pain since birth describe their body like an external object. A patient, for instance, said: "A body is like a car, it can be dented but it pops out again and can be fixed like a car. Someone can get in and use it but the body isn't you, you just inhabit it." (Frances and Gale, 1975, pp. 116–17). This seems to indicate that one needs affectively-loaded sensations to experience one's body as one's own. It thus seems that Descartes (1724) was right: "Nature likewise teaches me by these sensations of pain, hunger, thirst, etc., that I am not only lodged in my body as a pilot in a vessel" (*Meditation IV*) (see Chamberlain, this volume).

## **10. Euthyphro's dilemma**

In Euthyphro's dilemma, Plato noted that on the one hand, one may say that an action is just because it pleases the gods, but on the other hand, one may also say that the action pleases the gods because it is just. We seem to face a similar dilemma for ownership. On the one hand, one may claim that one experiences one's body as one's own because it has a special significance. On the other hand, one may also claim that for one's body to have such significance, one already needs to experience it as one's own. It might then seem that there is no way to determine what comes first, affective significance or the sense of bodily ownership.

However, one can avoid the apparent circularity in the case of bodily ownership because the notion of significance used here is grounded in biology. For the body to have personal significance is for it to be the body to protect for the organism's evolutionary needs. What happens to the body that has this significance happens to the subject. Why is it so? One possibility is that it is because one is one's body. Or more mildly, one can simply assume that one evolved in a world such that for the self to survive, its body must survive. In any case, the impact on what happens on this body for oneself gives immediate ground for labelling it as one's own. Hence, one is entitled to judge that this is one's own body when one feels that this body matters in this special way, because under normal circumstances the body that matters in such a way is one's own body. One might then say that the experience of ownership is nothing more than the awareness of the special value of the body for survival. It singles out the body that matters for self-preservation more than anything else. Hence, bodily awareness is not about the body *simpliciter*; it is about the body for the self because it matters for it. It is thus endowed with a specific affective colouring that goes beyond its somatosensory phenomenology. This affective colouring, one may argue, constitutes the phenomenology of bodily ownership

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