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## **Bodily feelings: Presence, Agency, and Ownership**

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### **1. Introduction**

This bodily presence is of a highly paradoxical nature. While in one sense the body is the most abiding and inescapable presence in our lives, it is also characterized by its absence. (Leder, 1990: 1)

At the sensory level we continuously receive a flow of information about our own body through external and internal perceptions. Not only can we see our body and touch it, but we also have several inner receptors that convey information about the position of our limbs, the balance of our body, and its physiological condition. Unlike external perception, the inner sensory flow never stops and cannot be voluntarily controlled: we can close our eyes, but we cannot shut our interoceptive system. Thus, an important amount of information is constantly available whether we want it or not, whether we pay attention to it or not. In that respect, our body qualifies as the object that we know best. Yet, despite numerous sources of information, the phenomenology of bodily awareness is limited. In painful and learning situations, our body appears at the core of our interest, but when we walk in the street, we are rarely aware of the precise position of our legs and while typing on our laptop, we do not vividly experience our fingers on the keyboard. Our conscious field is primarily occupied by the content of what we are typing, and more generally by the external world, instead of the bodily medium that allows us to perceive it and to move through it. We use the body, but we rarely reflect upon it.

This is not to say that we are completely unaware of it. Except in very rare illusory or pathological cases, we never feel fully disembodied. Instead, we are constantly conscious of the presence of our body, although at the margin of the stream of our consciousness.

We are immediately and directly aware of our body, at least in marginal form, at every moment of our lives, under all circumstances, and at whatever place we might happen to find ourselves. (Gurwitsch, 1985: 60)

But what is the content of this continuous marginal body consciousness? At first sight, it appears as less luxuriant and detailed than visual phenomenology, for instance, which can be analysed as full of fine-grained colour shades and well-individuated 3D shapes that move around. It seems to be reducible to the “feeling of the same old body always there” or to a mere “feeling of warmth and intimacy” (James, 1890: 242). But can we go beyond this rough and metaphorical description?

Here I shall focus on what I call bodily feelings, which express the various facets of the enduring relation that the subject has with her body in relation to the world. In this chapter, I will focus on three such feelings:

- (i) The body in the world: the feeling of bodily presence;
- (ii) The body in action: the feeling of bodily capacities;
- (iii) The body and the self: the feeling of bodily ownership.

After describing these bodily feelings in more detail, I will ask to what extent they are feelings at all, and if they are, how to best interpret their phenomenology: in sensory, affective, cognitive, or even metacognitive terms.

## **2. Beyond bodily sensations**

Let us imagine that I wake up in the middle of the night. I feel my heart beating too fast. The position of my left arm feels uncomfortable and painful. It feels nice to stretch on the bed and to feel the contact of the cold sheet on my skin. I feel too warm. I am thirsty. I get up but I lose my balance.

All those bodily sensations describe the ‘anecdotal’ state of the body, so to speak, that is the state of the body that keeps changing (e.g. its posture, its temperature, its movement, and so forth). They qualify as sensory insofar as they depend on sensory channels that are specifically dedicated to one’s body. Touch, which is sensitive to the pressure between the world and the body, provides information about both terms of the relation (Katz, 1925). Proprioception, which is sensitive to muscle stretch, tendon tension, and joint position, provides information about the position and movement of the body. Nociception responds to dangerously intense stimuli (Melzack and Wall, 1983). Interoception, which is based on cardiovascular, respiratory, gastrointestinal and urogenital systems, provides information about the physiological condition of the body in order to maintain optimal homeostasis (Sherrington, 1906). The vestibular system in the inner ear, which is sensitive to the pull of gravity and to motion acceleration as our head moves in space, provides information about the balance of the body (Ferrè & Haggard, 2016). There has been a recent booming of interest in these bodily senses, and in the experiences they give rise to. However, one should not believe that these bodily sensations exhaust the phenomenology of bodily awareness and it is important also to consider other types of experiences that are less directly connected to sensory receptors, what I call bodily feelings (also known as existential feelings, Ratcliffe, 2008).

Let us now imagine that before waking up in the middle of the night I was having a terrible nightmare in which I was floating in the sky but then suddenly started falling down. When I wake up leaving my bad dream for the reality of my bed, I become aware that I am alive and that all my limbs are intact. I am aware of my body as being here in my bedroom, no longer

floating up in the sky. I also become aware that this body has two legs and two arms that can cycle and swim, but that cannot fly. I am finally aware that this body is of a highly peculiar significance for me: it is mine, or maybe even it is me.

In what sense do these experiences differ from the experience of being seated for instance? One can first note that the sensation of being seated depends on the proprioceptive system, but there does not seem to be the equivalent of such a sensory system for the feeling of being alive. Arguably, bodily feelings cannot be directly derived from sensory inputs but involve more complex computations.<sup>1</sup> Furthermore, bodily sensations fluctuate all the time. You feel in pain and then you do not and then you do again; you are thirsty, you drink, you no longer feel thirsty until next time, and so forth. But there is a core of bodily awareness that is relatively permanent. This core is rarely at the forefront of consciousness, precisely because it normally does not change, and thus does not attract attention. It includes all these bodily feelings that describe what may be conceived of as the ‘fundamental’ state of the body, that is, the enduring relation of the body with the world and with the self. Here my objective is not to provide an exhaustive list of these feelings, and I shall simply focus on three main aspects: bodily presence, bodily capacities and bodily ownership.

### **3. Varieties of bodily feelings**

The notion of *feeling of presence* has originally been proposed to characterize the distinctive visual phenomenology associated with actual scenes, which is lacking in visual experiences of depicted scenes (Noë, 2005; Matthen, 2005; Dokic, 2010). When I see a picture of my son, my

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<sup>1</sup> Pain may be more complex insofar as it does not seem to be directly sensory-driven. But even then there remains a difference between suffering from a toothache and feeling alive. Unless for chronic pain, one varies while the other does not.

experience of him feels different from the experience that I have when I see him in front of me: he does not feel as being here. Seeing an object as present involves being aware of it as a whole object located in three-dimensional space, as an object that one can explore from different perspectives and that one can grasp, while seeing a picture of the same object only involves being aware of its material surface with certain configurational properties. In the same way that there is a feeling of presence associated with visual experiences of actual objects, I suggest that there is a feeling of *bodily presence* normally associated with bodily sensations. Most of the time we are only dimly aware of the various parts of our body, but as soon as we feel sensations in them, we become aware of their presence. For instance, when something brushes our knee, not only do we feel a tactile sensation, we also become suddenly aware of the presence of our knee, a body part that is rarely at the forefront of consciousness. The existence of the feeling of bodily presence is well illustrated by the experience of phantom limbs. Many amputees experience from the inside the continuous presence of their lost limbs, as described by the neurologist Mitchell, who first coined the term ‘phantom limb’:

There is something almost tragical, something ghastly, in these thousands of spirit limbs haunting as many good soldiers, and every now and then tormenting them with the disappointments which arise when the memory being off guard for a moment, the keen sense of the limb's presence betrays the man into some effort, the failure of which of a sudden reminds him of his loss. (Mitchell, 1871: 565-566)

The reverse may also happen, a kind of mental amputation, as in the depersonalisation disorder. Patients who suffer depersonalisation feel as if their body was no longer present: “The top part of my head often seems to disappear” (Sierra, 2009: 29) and to reassure themselves of the presence of their body they often feel the urge to touch their body or to pour hot water on it: “As I sense it I have the need to make sure and I rub, touch, and hurt myself to feel something.” (Sierra, 2009: 29).

Let us now turn to the awareness of one's own bodily capacities. Amputees with phantom limb not only experience the missing body part as being here but they often also experience it either as something that escapes their control or on the contrary, as something that they can move at will. Interestingly, their experience of control of their phantom limb differs from their experience of control of their prosthesis: the limb – although it is not real – feels as being *immediately* present to them to carry their actions. As famously noted by Descartes (*Meditation IV*), “I am not only lodged in my body as a pilot in a vessel”. Surprisingly, however, although agentive feelings have been extensively explored (Bayne, 2008), their embodied dimension has been largely ignored.<sup>2</sup> Most computational models and philosophical theories of action do not even mention the body, although action planning and control requires information about the posture of the limbs, their size, their strength, their flexibility, and so forth. It is often more optimal for bodily information to be left unconscious because the motor system needs to adjust very quickly and cannot afford the time that it takes to become aware of it. Nonetheless, we have some awareness of our body in action: we feel our arm raising, our legs kicking, our head turning. These kinaesthetic sensations normally accompany some – although not all – of our bodily movements. But is that all there is to the phenomenology of the acting body?

The notion of the sense of agency usually refers to the awareness of oneself as the cause of a particular action. I suggest here that there is also a more enduring notion of agency, which does not concern the punctual occurrence of a movement at time  $t$ , but the long-term capacity to move.

The self-awareness of a self-consciously competent bodily agent includes a familiarity with the possibilities for bodily acting that come with having the kind of

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<sup>2</sup> With the notable exception of O'Shaughnessy (1980) and Wong (2015).

body she has: for instance, a familiarity with the different movements that are feasible at different joints. (McDowell, 2011: 142)

Here I shall leave aside skill-based capacities (how to ride a horse or dance tango) and the associated feeling of competence, and focus exclusively on what may be called built-in capacities, which are determined by bodily configuration, size and strength, and by the flexibility of the joints. It is thanks to the awareness of bodily possibilities that one does not attempt to move in biologically impossible or painful ways. It is also thanks to it that one does not over- or under-reach when trying to get an object. One may not be aware of the exact strength of one's limbs or the precise degree of freedom of the joints. Nonetheless, one has some rough awareness of one's capacities, which can be used to explain one's course of actions (e.g. I chose this complex series of movements to reach my goal because I was not strong enough to do it otherwise).

Sometimes this rough awareness can be mistaken. Patients suffering from hysterical conversion have perfectly preserved motor abilities but they are convinced that they are partly paralysed and thus, they do not even intend to move. Conversely, patients suffering from anosognosia for hemiplegia are paralysed on the left side of their body but remain unaware of their paralysis. When asked to raise their left arm, they claim that they can do it, and even that they are performing the movement (although the arm remains still). An anosognosic patient, who is in a wheelchair, even claimed that he could go surfing: "Why not, if the wind is strong enough" (Cocchini et al., 2002: 2031). Finally, some schizophrenic patients experience what is known as the omnipotence delusion: they take themselves to have divine powers, such as the ability to fly or to run faster than the light. In all these cases, patients fail to be aware of what they can and cannot do.



The agentic dimension of bodily awareness brings to light the intimate relation between the body and the self, but one can go a step further: one does not normally experience *a* body that immediately responds to one's intentions; one normally experiences *one's own* body. Any account of the phenomenology of bodily awareness must thus also include an account of its first-personal character. I do not mean here the subjectivity of my bodily experiences (*I* feel), but the sense of bodily ownership (*my own* body). The notion of bodily ownership carries with it no specific metaphysical assumption one way or the other.<sup>3</sup> It only states that this particular body has a special significance for the subject. The challenge is to spell out in what sense this body is special.

One should avoid an interpretation in terms of *familiarity*, which would be too weak. Bodily awareness includes a feeling of familiarity with one's own body, but the sense of bodily ownership cannot be reduced to it. There are indeed many bodies that we are familiar with and that have a personal significance. The function of the feeling of familiarity is to track any body with which one has had sufficiently many previous encounters. Therefore, it cannot ground self-ascriptive bodily judgments (e.g., *this is my own body*). One should also avoid an interpretation that would be too strong: the special relationship that is expressed by the sense of bodily ownership is not of *identity*. The sense of identity and the sense of bodily ownership normally go together. However, they play different epistemic roles: the former can ground judgments of the type "*I am raising my hand*" whereas the latter can ground judgments of the type "*This is my hand raising*". In the case of face transplant, the issue is not only of recognizing

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<sup>3</sup> It does not express that the self is embodied or, on the contrary, that it is not (it might seem that an object that is own must be distinct of its owner).

the new face as one's own, but also of recognizing *oneself* when looking at the mirror.<sup>4</sup> This is why face transplant has been allowed only recently (Dubernard et al., 2007).

The sense of bodily ownership should thus be reduced neither to the feeling of familiarity nor to the sense of identity. But then what is it? The most neutral definition is to say that it consists in the feeling that one experiences when one is aware of a body as being one's own. One may go a step further and propose that the feeling of ownership is a feeling *in virtue of* which one is aware of a body as being one's own. Most of the time it targets only the body that belongs to the subject. In some rare contexts, however, it can concern an extraneous object, as in the Rubber Hand Illusion (hereafter RHI). In the classic experimental set up, one sits with one's arm hidden behind a screen, while fixating on a rubber hand presented in one's bodily alignment; the rubber hand can then be touched either in synchrony or in asynchrony with one's hand. After a few of minutes, one can report that it seems as if the rubber hand was one's own hand (Botvinick and Cohen, 1998). Conversely, one can lack a sense of ownership for one's own body. Patients with depersonalisation not only feel that their limb has disappeared but also that it no longer belongs to them. It can occur also in patients with somatoparaphrenia, who after a lesion in the right parietal lobe deny that their limbs belong to them. When shown her own limb and asked whose hand it was, a patient replied: "How am I supposed to know whose hand is this? It's not mine" (Gandola et al., 2012: 1176).

## 2.2 *Lack of presence or absence?*

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<sup>4</sup> By face transplant, one means the transplantation of new composite tissue on the underlying bones and muscles that have remained intact. The new face never resembles the old face, but it neither resembles the donor's face.

We have just seen that bodily awareness normally includes the awareness of one's body as being present in the world, as being able to carry actions, and as being one's own body. We have also seen that in some pathological conditions these various aspects of bodily awareness can be replaced by the opposite experience: the sense of presence by the sense of absence and disappearance in depersonalisation, the sense of bodily capacities by the sense of bodily incapacities in hysterical conversion, and the sense of bodily ownership by the sense of bodily disownership in somatoparaphrenia. One may then wonder whether these pathological forms of bodily awareness merely express the lack of the corresponding bodily feeling or whether there is more to these pathological senses. In other words, can we reduce the sense of absence to the absence of the sense of presence and the sense of disownership to the absence of the sense of ownership?

Consider the case of internal organs. They are parts of our body and we can feel painful sensations there. Yet the awareness we have of them is very limited. More specifically, we do not experience them as being present, nor do we experience them as being parts of our body in the same way we experience our arms or our legs. For all that we do not experience them as disappearing, nor do we experience them as alien. What this example shows is that the lack of the sense of bodily presence and ownership does not necessarily entail the sense of bodily disappearance and alienation. Why, then, do some patients experience their limbs as absent and foreign to them? Arguably, they have no sense of presence and ownership for these limbs. In that respect, there is no difference with their awareness of their internal organs. Yet there is a major difference: it is normal to lack these feelings in the case of their internal organs but it is not in the case of their limbs. The sense of disappearance and of disownership therefore expresses not only the lack of bodily feelings, but also some degree of awareness of the abnormality of the situation. Then the question is: what conclusions about normal bodily awareness can we draw on the basis of these pathological feelings? More specifically, can one

appeal to these disorders in order to show that there is a distinctive phenomenology associated with the sense of presence, capacities and ownership?

### *2.3 Feeling or merely knowing?*

The notion of awareness is ambiguous insofar it can refer both to what the subject feels and to what she judges. One may then question whether the various components of bodily awareness that I have described so far have an experiential counterpart or whether they are manifested to the subject only in the form of beliefs or judgements (Alsmith, 2015; Bermúdez, 2010, 2011, 2015; Martin, 1992, 1995; Mylopoulos, 2015; Wu, forthcoming). For instance, Bermúdez claims that there is no “distinctive experience of agency” (Bermúdez, 2010: 588) and that “the feeling of ownership is just a philosophical fiction” (Bermúdez, 2017), while Wu (forthcoming) concludes, “We have, I believe, no good reason to take ownership to be a substantive phenomenal feature of experience. It is all in the judgment”. On such an apparent eliminativist account, we have beliefs about what we do and about whose body is ours, but these beliefs are not grounded in some specific feelings of agency or ownership. Instead they are grounded in some fundamental facts about kinaesthetic and bodily experiences. This hypothesis is parsimonious insofar as it does not posit extra phenomenal properties. But it might be too parsimonious and thus, fail to account for the reports that subjects give in borderline situations.

Consider again the case of phantom limbs. Why should we take the patients to their words when they claim that they *feel* the presence of their phantom hands, that they *feel* them as being parts of their bodies and that they *feel* they could (or could not) control them? One reason is that they make such reports although they are fully aware that their limb is missing. A patient described his experience as follows: “To anyone looking at me, I have no arm. But I can feel the entirety of my phantom hand and arm.” (Mezue and Makin, 2017). Hence, it can seem to

one that the limb is present while correctly judging that it is not. Such a decoupling between appearance and knowledge calls to mind classic visual illusions, such as the Müller-Lyer illusion: one has a visual experience of the two lines as being different, while having the belief that they are actually of the same size. One may then provide a similar explanation to the phantom presence: one *experiences* the limb as being present in the same way as one *experiences* the lines as being different. The argument schema has been called the argument from cognitive impenetrability (Mylopoulos, 2015). It assumes that there is a feeling of  $x$  if it seems to one that  $x$  while one correctly judges that there is no  $x$  (Harcourt, 2008)

However, the argument from cognitive impenetrability has been criticized on the ground that other attitudes than feelings and sensations can be encapsulated and immune to the influence of beliefs and judgments (McDowell, 2011; Bermudez, 2015; Mylopoulos, 2015). But what attitudes precisely? The eliminativists often remain relatively vague when it comes to describing their positive view. It is true that one can *suppose* that  $x$  while one knows that  $x$  is not true, and that supposition is not a feeling. However, I doubt that they would claim that the amputee *supposes* his hand to be here. Imagination may be a better candidate. However, imagination is generally under voluntary control, whereas the patients cannot stop feeling the presence of their limb. Furthermore, imagination involves mentally recreating selected experiences (Goldman, 2006). If one does imagine the missing hand as being here, it means that one imagines *experiencing* it as being here.

To recapitulate, the argument from cognitive impenetrability is not conclusive: it does not state that there must be a feeling of  $x$  if it seems to one that  $x$  while one correctly judges that there is no  $x$ . There may be alternative interpretations of the dissociations in cognitive terms but the crucial question is whether these cognitive interpretations fare better than the interpretations in experiential terms. Whether there are bodily feelings or not will thus eventually depend on an inference to the best explanation. Furthermore, it is worth mentioning

that those who question the validity of the argument from cognitive impenetrability primarily target *sensory* phenomenology: a person does not need to have a *sensory* experience of  $x$  just because it seems to her that  $x$  although she knows that  $x$  is false. However, some of them at least seem to be willing to accept a non-sensory phenomenology of  $x$ , and more particularly of a cognitive type (Alsmith, 2015; Mylopoulos, 2015). Consider the case of the feeling of *déjà vu*. Suppose I have a *déjà vu* experience although I perfectly know that I have never been here before. In this case, it seems legitimate to assume that it feels something specific when I have this experience. Arguably, this feeling is not sensory and its grounds are relatively complex, involving metacognitive monitoring of visual processing. Still, there is a distinct phenomenology associated with the feeling of *déjà vu*. One can also mention the feeling of familiarity. It cannot be reduced to the recognition of the visual features of the face, but involves autonomic responses, which result in increased arousal in front of familiar faces (Ellis and Lewis, 2001). But again it is characterized by a specific phenomenology, which can be conceived of in affective terms (Dokic and Martin, 2015). Here I will suggest that some bodily feeling should be analysed in the same way as these non-sensory types of feelings.

There are then two ways such feelings might be understood in representational terms. Firstly, they can be conceived of as affective colouring, or specific modes of presentation, of the sensory content of perceptual experiences (Matthen, 2005). This solution, however, opens more questions than it answers. Alternatively, feelings can be conceived of as proper experiences distinct from the sensory experiences that they are bound to (Dokic and Martin, 2015). In favour of the latter view, Dokic and Martin (2015) appeal to the feeling of *déjà vu*. They suggest that it should be interpreted as a free-floating feeling of familiarity without any associated sensory experience. If this is the correct interpretation, then affective feelings can be fully independent from sensory experiences. However, Dokic's and Martin's claim seems too strong: the feeling of *déjà vu* is not completely disconnected from any sensory experience; it is bound to the global

sensory content of a scene, although one does not know which particular object or event in this scene triggers the feeling. If we now turn to bodily experiences, it seems even more difficult to conceive of free-floating feelings of ownership, for instance. There is thus no clear answer to this debate so far and I shall thus leave it open here. I shall now leave these general issues to analyse in detail each bodily feeling.

#### **4. The sense of bodily presence**

Let us first consider the feeling of bodily presence. As argued in the previous section, one can feel the limb as still being here while one knows that it is not true, as in the case of phantom limbs. The feeling of phantom presence cannot be reduced to the experience of phantom sensations. According to the neurologist Melzack (1992), the feeling of presence of phantom limbs is only “reinforced” by the kinaesthetic, tactile, thermal and painful sensations that the amputees experience as being located in their phantom limbs, but it goes beyond them. Let us now consider the mirror phenomenon, namely, depersonalisation disorder. As for amputees, it seems difficult to account for the patients’ reports in purely cognitive terms. They are indeed greatly disturbed by what they experience and yet they know that their body is still here, it only seems to them as if it was not. How could mere “as if” judgments account for such an emotional impact? It rather seems that they do *feel* their limbs as missing. Furthermore, depersonalised patients can still feel sensations in their body that they feel as disappearing: “Even if I touch my face I feel or sense something but my face is not there” (Sierra, 2009: 29). Hence, the feeling of presence (or the lack of it) cannot be simply explained away by bodily sensations (or the lack of them). One can still experience sensations to be located in a body part and still not feel this body part as being present. How, then, should one account for the feeling of bodily presence? As mentioned earlier, the notion of presence has been discussed primarily in the context of

visual experiences. Several theories have then been proposed and I shall not review them here. Instead I shall focus only on the sensorimotor conception and highlight both its insights and its limits.

Noë's (2005) notes that when facing a tree, one sees only one side of it and yet one is aware of the whole tree. On his view, to be aware of the presence of the tree is then to know that if one walks around the tree, one can see the other side. By contrast, when facing the painting of a tree, there is no hidden side of the tree that one could access. Thus, one does not experience the depicted tree as being present. Likewise, Matthen (2005) claims that one feels an object as visually present thanks to the fact that one knows one can act on it, whereas one cannot act on the object depicted in a picture. He thus suggests that the source of the feeling of visual presence can be found in the involvement of visuo-motor processing in visual experiences. One may then propose a sensorimotor account of the feeling of *bodily* presence. When I have an itching sensation on a small spot at the back of my knee, I am aware not only of the limited area of the body in which I localize the sensation but of the whole three-dimensional knee, both sides included. On a sensorimotor account, the feeling of the presence of the whole knee consists in knowing how to act on this body part. My itching sensation is just about a small area on the two-dimensional sheet of my skin, but my scratching it involves being aware of the volume of the whole joint.

The sensorimotor account of bodily awareness faces many problems and I shall not list them all here (for discussion, see Vignemont, 2011). Let us simply note that knowing how to access the unfelt part of one's body does not suffice for the feeling of bodily presence. Consider first the case of visual experience (Kind, forthcoming). There is a bottle in front of you. You may feel the whole bottle as being present, including the side hidden from sight, but you do not feel the liquid in it as being present in the same way. Yet you do know that if you look inside the bottle, you will see the liquid. You thus have the right sensorimotor expectations, but no feeling



of presence. Similar examples can be offered for the feeling of bodily presence. For instance, a surgeon knows how to access a tumour inside him but for all that he may not feel his tumour as being present. Hence, there is more to the feeling of presence than some kind of know-how.

A further issue concerns Noë's starting point: how are we aware of the hidden side of perceived objects? But this question only highlights the fact that we are aware of objects in their entirety as three-dimensional volumes and it is not clear that it fully captures the phenomenology of presence (Dokic, forthcoming). Indeed what appears as crucial for the feeling of presence is the awareness of externality rather than of volume, what one may call a feeling of "here-ness": one is aware of the object as being here, that is, as occupying a portion of the external world.<sup>5</sup> It may then seem that the feeling of presence is an *enabling condition* for actions. If you do not feel the object to be here, you do not plan to act on it. No matter how minimal the involvement of consciousness can be for action, it seems that some awareness of the presence of the object is required. Hence, the feeling of presence is tightly linked to action but its relationship should not be conceived of in constitutive terms.

What then seems to provide both externality and this link to action is the egocentric perspective. On the one hand, it localizes the perceived objects in their spatial relation to the perceiver's body or parts of his body. On the other hand, it is required to plan movements in the direction of the objects. However, one may question whether the notion of egocentric frame of reference can be applied to bodily awareness insofar as one cannot provide a center of this frame, nor suggest axes on which one could compute distances and directions for bodily sensations (Bermudez, 1998). Still, when experiencing bodily sensations one should not believe that we are locked in the space of our body. The body that we experience is not only an inside;

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<sup>5</sup> Here I use a relatively minimal notion of presence, which does not entail reality. On this view, the feeling of presence can be part of the phenomenology of imagination and dream (Nanay, 2016).

it has also an outside in which it navigates. For instance, when we feel touch on our hand, not only do we experience the pressure in a specific location within our long-term body image (e.g., our right hand), we also experience this part of our body in a specific location in the external world (e.g., on the left). Another way to put it is to say that bodily sensations have two types of felt location, which I respectively call *bodily location* and *egocentric location* (Vignemont, in press). Bodily location is the location in a specific part of the body, no matter where the body part is located: when I move my hand, the bodily location does not change. By contrast, egocentric location depends on bodily posture, and is thus given within an egocentric frame of reference: it is the location relative to the other parts of the body at the time of the sensation. The spatial duality of tactile sensations is well illustrated by the Japanese illusion. Cross your wrists, your hands clasped with thumbs down. Then turn your hands inward until your fingers point upward. If now I touch one of your fingers, you will have difficulty not only in moving the finger that is touched, but also in reporting which finger it is. If tactile sensations had only bodily locations, then this complex posture should make no difference (a touch on the right index finger remains on the right index finger no matter where the finger is located). The difficulty that you have in the Japanese illusion thus shows that the relative location of body parts matters. Thanks to their egocentric locations, bodily sensations can be said to be anchored in external space: one is aware of the body part in which one feels sensations in a space larger than one's body. Thanks to their egocentric locations, one can act on the body part that hurts or itches.

In summary, the feeling of bodily presence expresses the awareness of the relationship between one's body and the external world. This relationship should be understood in spatial terms: one experiences one's body as being 'here' in three-dimensional space. But it has sensorimotor consequences: in this external world, this is a body that one can act upon. On this view, the feeling of presence is relatively primitive. It results from *sensory* processes of spatial

remapping from a bodily frame to an egocentric frame. This account is thus at odds with other more sophisticated conceptions that describe the feeling of presence in terms of cognitive or affective phenomenology (Dokic and Martin, 2015; Dokic, forthcoming). The difficulty that the affective conception faces, however, is that there is no clear valence or motivational role that is intrinsic to the feeling of presence. As said earlier, presence is only the background condition for motivation. On its own the feeling of bodily presence is simply neutral: you can act on it or not; it does not invite you to choose a course of action. Nonetheless, Dokic (forthcoming) suggests that feelings of presence do play a motivational role: “They have a non-sensory, affective-like phenomenology, in the sense that we feel motivated to form specific judgments about what we perceive”. This definition of affective phenomenology, however, may be too liberal and many states that bear no relation with emotions may end up being “affective-like”. Instead I want to propose that the nature of the phenomenology of bodily presence is simply sensory. It has a clear mind-to-world direction of fit: it expresses that something is here and it is accurate only if this thing is here.

## **5. The sense of bodily capacities**

Let us now turn to a more directly sensorimotor dimension of bodily awareness, namely, the awareness of one’s own bodily capacities. To some degree we are aware of what our body can and cannot do. What is the origin of such awareness? One may be tempted to reply that I know that I can move on the basis of the simple fact that I am moving and I know that I am moving on the basis of proprioceptive, tactile, visual and vestibular information, as well as on the basis

of efferent information.<sup>6</sup> This is different, however, in the case of the awareness of one's bodily incapacities: I am not entitled to conclude that I cannot move from the fact that I am not moving. In that case indeed, I also need to be aware that I intended to move and that no external constraints prevented me from moving. It is only the discrepancy between my intention and the absence of movement in this specific context that entitles me to conclude that I cannot move. The comparison between efferent and afferent information then enables me to decide how much my body obeys or betrays me. However, the awareness of bodily capacities should not be reduced only to the awareness of *bodily obedience*. As said earlier, I am interested in a more enduring notion of agency, one that is not tied to the occurrence of a movement, nor of a motor intention.

There are two complementary sources of information for this enduring sense. On the one hand, one has information about the various bodily parameters that are necessary to plan action, which are represented in what is known in the literature as the body schema (Vignemont, 2010). For instance, my son can know whether he can reach the chocolate bar in the cupboard by comparing the estimated sizes of his body and of the cupboard. Several studies have shown how reachability judgments can be modulated by altering the body schema (Bourgeois et al., 2014). This solution works well for specific movements that have never been achieved before. But imagine now that every day after school my son grabs a chocolate bar in the cupboard. It seems that his reachability judgment is then grounded in the memory of the series of his previous success: he knows that he can do it because he did it before. By monitoring one's performance, one can indeed become aware of what one can do. More specifically, one can exploit two cues: the ratio of success to failure and the ease or difficulty associated with

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<sup>6</sup> When one moves, one anticipates the sensory consequences of one's movements, which allows anticipatory control (Desmurget and Grafton, 2000). Such sensory prediction can then give rise to kinaesthetic experiences. This explains how one can feel that one is moving before the movement has even started (Libet et al, 1983).

performing the movement. Compare linguistic ability: you know that you can speak a foreign language if you were able to communicate without too much effort before.

The sense of one's capacities then results from monitoring one's own performance, and thus qualifies as being metacognitive.<sup>7</sup> Metacognitive awareness, however, can be either theory-based or experience-based (Koriat, 2000). Consider the following example. If you are asked about the date of the end of the Roman Empire, you may be able to give a reply although you are not certain that you are right. Your lack of confidence can result from the fact that you know that you have a poor memory for dates and that you have always disliked history. Alternatively, you have a kind of intuitive feeling, something akin to a 'gut feeling', which tells you that you do not really know. This feeling of confidence (or its absence) is what some call a noetic feeling, along with feelings of knowing, feelings of 'déjà vu', and tip-of-the-tongue experiences (Dokic, 2012). It involves implicit monitoring of one's cognitive capacities, for instance how rapidly and easily our memory system retrieves the answer. The question is: is there another type of metacognitive feeling, something like a "Yes, I can", which gives rise to the awareness of one's bodily capacities? Unfortunately, we cannot use the argument from cognitive impenetrability here. In hysterical conversion, in anosognosia for hemiplegia and in schizophrenia, patients are delusional: they believe, and not only feel, that their body can or cannot do this or that. Furthermore, as far as I know, no Superman illusion has been tested (one would be made to feel as if one could do more than one knows to be physically possible).<sup>8</sup> Consequently, one may argue that metacognitive judgments about one's bodily capacities are exclusively theory-based:

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<sup>7</sup> For a metacognitive account of the sense of agency, see Carruthers (2015).

<sup>8</sup> A couple of studies used virtual avatars with superpowers (such as the ability to fly, Rosenberg et al. 2013) or with anatomically incongruent limbs (such as having very long arms, Kilteni et al., 2012) but they did not investigate the sense of capacities.

one *infers* what one can or cannot do on the basis of past actions; this is not something that one experiences.

Still, one might be tempted by a phenomenological account of the sense of bodily capacities. More specifically, I propose to interpret it in terms of the metacognitive experience of *global fluency*. Fluency can be defined as “the subjective experience of ease or difficulty associated with completing a mental task” (Oppenheimer, 2008: 237). One may then distinguish between local and global fluency. Whereas local fluency concerns a specific process at the time it occurs, global fluency concerns a series of similar processes over time. More specifically, in the case of action it has been shown that the sense of agency can partly result from fluency in action selection: the easier the process to select which movement to perform is, the more control one feels in (Chambon and Haggard, 2012). This experience of fluency is local: it exclusively concerns the action in progress. However, one needs first to learn through expertise that selection fluency is a reliable cue for successful outcome. Hence, one needs to keep track for each action that fluency is associated with good control (Chambon et al., 2014). In the case of the feeling “Yes, I can”, the hypothesis is that the accumulation of local fluency experiences generates fluency expectancies and that these expectancies give rise to a diffuse experience of global fluency. Roughly speaking, you feel that things will go smoothly in the future because you feel that they have been going smoothly so far. This is not only something that you know; this is something that you feel. Insofar as agentic phenomenology remain largely “thin” and “evasive” (Metzinger, 2006), one can conceive that one can easily miss this specific metacognitive feeling. Yet it is part of our mental life in the same way as the feeling of confidence is.

In summary, one can experience a sense of agency while controlling the movements of a cursor on a screen, but when one controls the movements of one’s own body, its phenomenology becomes richer, including kinaesthetic experiences of the body in movement

based on the integration of efferent and afferent information (from proprioception, vision and touch), a sense of bodily obedience based on the comparison between what one intends to do and what one does, and finally a metacognitive sense of the possibilities open to one's body based on the monitoring of one's past performance.

## **6. The sense of bodily ownership**

Among bodily feelings, the feeling of bodily ownership has been the most investigated as well as the most controversial one. The main question is whether there is a primitive nonconceptual awareness of ownership. The RHI has been taken as evidence that there is such a thing as a feeling of bodily ownership because participants are fully aware that the hand that they report as their own is a mere piece of rubber (Vignemont, 2013; Peacocke, 2014). Further dissociation between feelings and judgments of ownership can also be found in depersonalisation as well as in xenomelia (also known as Body Identity Integrity Disorder). Little is still known about xenomelia but patients describe an overwhelming desire to be amputated of one of their perfectly healthy limbs because it does not feel as part of their body. Yet they know the limb that they want to cut is their own: "Inside I feel that my legs don't belong to me, they shouldn't be there (...) I would almost say as if they're not part of me although I feel them, I see them, I know they are" (Corrine in "Complete Obsession," BBC, 17th February, 2000).

It is true, however, that these illusory and pathological dissociations are open to interpretation and some claim that they can be accounted for in purely cognitive terms (Alsmith, 2015; Bermúdez, 2015; Wu, forthcoming). They may further argue that there cannot be feelings of bodily ownership (Bermúdez, 2011; 2015). In order to defend his view, Bermúdez appeals to Anscombe's (1962) epistemological argument. She claims that sensations must be able to ground knowledge, and in order to do so, their internal content must be "independently

describable”: there is a sensation of  $x$  if its description has a different content than  $x$  and this content is taken as a sign that indicates  $x$ . For example, there is a sensation of going down in a lift since one can provide an independent description of its internal content in terms of lightness and of one’s stomach lurching upward. By contrast, it is not legitimate to talk of sensation of sitting cross-legged, Anscombe claims, because there is no such independent description that can be given. Likewise, Bermúdez (2015) assumes that one cannot describe the sense of ownership without referring to the fact that this is one’s own body (i.e. myness), and thus there are no feelings of ownership:

It is highly *implausible* that there is a determinate quale of ownership that can be identified, described and considered independently of the myness that it is supposed to be communicating. (Bermúdez, 2015: 39, my underline)

The problem, however, is that each step of Anscombe’s argument can actually be questioned. In particular, it is unclear why sensations require independent content and how we should interpret this notion of independent content. It is even less clear why there cannot be independent descriptions for bodily awareness. Neither Anscombe nor Bermúdez give arguments for this claim on which their whole argument rests. They merely state it. Bermúdez (2015: 44) further adds that ownership is “a phenomenological given” and that it is impossible to ground it in further non-conceptual content. But this seems to be simply begging the question. By offering no principled reasons for their assumption, they undermine their own objection.

A different type of objection against the feeling of ownership arises from the assumption that there is no additional feeling beyond the felt location of bodily sensations (Martin, 1992, 1995). Martin proposes that the distinction between what is one’s own body and what is not one’s own body should be phrased exclusively in spatial terms, between inside and outside bodily boundaries in which one can experience bodily sensations. He makes the following



metaphysical assumption, which he calls the Sole Object view: there is an identity between one's own body and the body in which one locates bodily experiences. This identity, he claims, enables the spatial content of bodily experiences to ground bodily self-ascriptions. Consequently, it is sufficient to feel sensations as being located in a body part to experience this body part as one's own: "this sense of ownership, in being possessed by all located sensations, cannot be independent of the spatial content of the sensation, the location of the event" (Martin, 1995: 277).

However, one may wonder whether Martin does not eliminate the first-personal character of the sense of bodily ownership by trying to reduce it in such a way. One may indeed question the validity of the Sole Object view, and without this background metaphysical assumption, there is nothing in the spatial content of the sensation itself that justifies bodily self-ascription. Contrary to what he claims, it does not suffice for one to feel sensation in a body part to experience this body part as one's own. Some patients actually experience a sense of bodily disownership despite the fact that they still feel sensations in their so-called 'alien' limb. This is the case of patients with somatoparaphrenia who can feel touch and cry out of pain if the examiner pinches their 'alien' hand (Melzack, 1990; Maravita, 2008; Bottini et al 2002; Cogliano et al., 2012; Moro et al 2004). Despite feeling these sensations to be located in their 'alien' hand, they maintain that it does not belong to them.

To recapitulate, the debate is still open whether they are – or not – feelings of bodily ownership. It is true that the argument from cognitive impenetrability is not a sufficient proof, but it is still *a* proof in favour of ownership feelings and it is not clear that there is any plausible alternative account of illusory and pathological ownership. Furthermore, there have not been yet any fatal objections against ownership feelings. It rather seems that the phenomenology of ownership is over and beyond the spatial phenomenology of bodily sensations. The question now is how to best characterize it.

I propose here to describe it on the model of the feeling of familiarity. As discussed earlier, the feeling of familiarity that is elicited by the perception of face that have personal significance can be conceived of as a specific type of affective phenomenology that goes beyond the sensory recognition of the face. The phenomenology of visual experiences can thus be dual, both sensory and affective, and because of this duality, it is possible to have dissociations, as in the Capgras syndrome (Dokic and Martin, 2015). Patients with Capgras syndrome can see that a person is visually identical to their spouse for example, but they do not feel that she is their spouse and they believe that this person must be an impostor. Their sensory phenomenology is thus intact, but they lack the affective responses normally associated with it. Their delusion of an impostor is only an attempt to explain their ‘incomplete’ perceptual experiences of their spouse. By contrast, patients with Frégoli delusion have an anomalously heightened affective responsiveness for unknown individuals, and thus believe that they are surrounded by familiar persons in disguise (Langdon et al., 2014).

I claim that the feeling of bodily ownership can be conceived of as another type of affective phenomenology, which goes beyond the sensory phenomenology of bodily sensations and which involves autonomic responses. We can now reinterpret cases of somatoparaphrenia and xenomelia in which patients can still feel bodily sensations located in the body part that feels as alien. As in Capgras syndrome, these patients have their sensory phenomenology preserved, while their affective one is missing. It was found indeed that when patients with somatoparaphrenia and with xenomelia saw their ‘alien’ hand threatened, they did not react to protect it (Romano et al., 2014; Romano et al., 2015). By contrast, participants who experience the RHI have their sensory phenomenology preserved, while their affective one is misguided (directed towards the wrong hand), and the illusion should thus be compared to Frégoli delusion. Indeed, subjects in the RHI react vividly when they see the rubber hand threatened

and the strength of their reaction is correlated with their ownership rating in questionnaires (Ehrsson et al., 2007).

One should not believe, however, that the hypothesis that I defend, which I call the Bodyguard hypothesis, is that the body that one protects is the body that one experiences as one's own. Since one protects many things besides one's body and since one does not always protect one's body, this latter thesis is indeed clearly untenable. Instead I propose that the sense of bodily ownership is grounded in a specific type of body representation, which I call the *protective body map*. Because of the significance of the body for survival, there is a specific representation to fix what is to be protected. One does not protect one's biological body; one protects the body that one takes oneself to have and the protective body map, like any representation, can misrepresent one's biological body and include a phantom and a rubber hand, or fail to include one's own hand. This protective body map commands us to protect the body that it represents, but we can always disobey its command and our disobedience does not show a deficit of protective body schema; it merely shows that we have ceased to act on it. The Bodyguard hypothesis thus only claims that one experiences as one's own any body parts that are incorporated in the protective body map (for more details, see Vignemont, forthcoming).<sup>9</sup>

## Conclusion

To conclude, although elusive, bodily awareness is rich, especially when things go wrong. It includes not only sensations of touch and tickles, of heat and cold, of pain and fatigue, of hunger and thirst, of postures and movements, but also a range of bodily feelings that express the

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<sup>9</sup> Here I limit the scope of the Bodyguard hypothesis to humans and assume that the protective body schema can ground the sense of bodily ownership only given the suite of cognitive capacities that human beings normally have. I leave aside the delicate issue of the sense of bodily ownership in other animals.

presence of one's body in the world, ready to act on it and to protect itself from it. The phenomenology of bodily awareness should thus not be conceived of simply in sensory terms, but also in affective and metacognitive terms.

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