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## **Chapter ###**

# **The Marginal Body**

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### **Abstract**

According to Gurwitsch, the body is at least at the margin of consciousness. If all components of the field of consciousness were experienced as equally salient, we would indeed not be able to think and behave appropriately. Though the body may become the focus of our conscious field when we are introspectively aware of it, it remains most of the time only at the background of consciousness. However, we may wonder if bodily states do really need to be conscious, even at the margin, or cannot be simply non-conscious. Action control requires permanent proprioceptive and visual feedback about the state and the position of our body parts. Experimental data show that action monitoring operates at a nonconscious level and we may similarly suggest that we have a continuous unconscious access to bodily information. In this chapter, I thus intend to describe the various levels of body representations with the help of Gurwitsch's distinction. I will investigate the properties and the function of each of these levels.

### **Introduction**

We spend the first year of our lives in self-exploration of our body. By looking at the mirror, playing with our limbs, touching our face and imitating others, we construct fine-tuned body representations that will allow us to recognize ourselves, to move, and to interact with the world (Rochat, 1998). After this early calibration, it seems that we no longer need to pay attention to our body, which has become a well-known tool that we frequently use without even thinking of it. The priority is given to the external world. Yet, this marginal body is not negligible for all that. Despite its peripheral status, it is still mentally represented, and even consciously. In this essay, I provide two compatible interpretations of the notion of marginal body: as bodily experiences in the background of consciousness and as unconscious sensorimotor schemata. With the help of Aron Gurwitsch's distinction (1964, 1985) and some clarifications of his main hypotheses, I intend to sketch the different levels of body representations.

### I. The Visible and the Invisible Body

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. That is, one's own body is rarely the thematic object of experience. (Leder, 1990: 1)

How can the most permanent and preponderant object in our life be also the most elusive one? The presence-absence of the body can be understood at two different levels: the sensory one (which bodily information I receive) and the phenomenological one (what I feel).<sup>1</sup> At the sensory level, we continuously receive a flow of information about our own body through external and inner perceptions. Not only can we see or touch it, but we also have several inner receptors that convey sensory data about joint position, muscle stretching, pain, temperature, posture, balance, and nutrition. Unlike external perception, the inner sensory flow never stops and cannot be voluntarily controlled: you can close your eyes, but you cannot prevent the sense of balance. Thus, an important amount of information is always available, whether we want it or not, whether we pay attention to it or not. This “on line” visual and proprioceptive feedback allows us to plan, initiate, and control our actions. At this basic level, the body is always present in all its details. However, it does not seem that this precision is preserved at the phenomenological level. I will start with a very general statement: except in sensory deprivation state, we never feel disembodied and we can even feel as if a body part still exists when it has been amputated in the phenomenon of phantom limb (Ramachandran and Hirstein, 1998). One's own body is characterized by its permanency and constitutes a point of reference for the dynamic world (Merleau-Ponty, 1945) and for the dynamic stream of consciousness (James, 1890). Each perceived object is encoded into an egocentric frame of reference centered on the body (Gurwitsch, 1985; Jeannerod, 1997). Moreover, according to William James, the bodily presence characterized by the “feeling of warmth and intimacy” would constitute the inner nucleus of the Self, that is, the intrinsic liaison between experiences. Thus, James suggested that the stream of thinking is in fact a stream of breathing. So, “the feeling of the same old body always there” (James, 1890: 242) would anchor both the external and the inner world.

Yet, most of the time this feeling is only in the background of consciousness. As Merleau-Ponty (1964) said, the body is “invisible”: I do not see my eyes, I see the object seen by my eyes. It is true that I receive a large amount of information about the position of my eyes. Nonetheless, the focus of my attention is generally the external world rather than the medium

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<sup>1</sup> Similarly, Gallagher (2003) draws a distinction between proprioceptive information and proprioceptive awareness.

that allows me to perceive it and to move through it. We use the body, but we rarely reflect upon it. In painful and learning situations, the body appears at the core of our interest, but when we walk in the street, we are never aware of the precise position of our legs, and even less of our internal viscera state. This bodily absence could even explain Cartesian dualism (Leder, 1990): the *prima facie* fact is the *res cogitans* and not the *res extensa* of the body as the latter is less salient.

In summary, on the one hand, the body is not an object among others that could leave me or disappear; but on the other hand, even if all actions depend on it, it is rarely the focus of attention. Therefore, the question is to understand the cognitive organization that underlies this paradox pointed out by Leder. But is this really a paradox? We can avoid the contradiction if we assume that we are talking of body representations at different cognitive levels. The question is thus to determine which levels. Rather than a dichotomy between conscious and unconscious states, James and Gurwitsch introduced a distinction within the field of consciousness itself between core and fringe states. In this latter sense, we are always aware of our body. However, as we will see later, this awareness does not extend to all bodily states.

## II. The Structure of Consciousness

William James and Aron Gurwitsch emphasized the permanence of the feeling of bodily presence, but acknowledged that the body usually stays in the background of consciousness. There is no paradox here because of the organization of consciousness itself. William James challenged the Empiricist view according to which the field of consciousness should be conceived as chaos of experiences and claimed that conscious experiences are articulated into the focus and the margin. However, the organization stays extrinsic to the stream itself<sup>2</sup> and there is no distinction inside the margin itself: when I am reading a paper, the general knowledge that I have about its topic and my eye movements are put on the same level. Gurwitsch (1964) challenged this view and postulated an immanent organization of the field of consciousness articulated by the intrinsic relation of relevancy between the material content of the theme and some co-present data. He claimed the existence of three (and not two) dimensions: the theme upon which the mental activities concentrate, the thematic field or context that is relevant to the theme, and the margin, which is co-present with the theme but irrelevant to it. Inside the margin, he also made a distinction between the halo that is externally related to the theme, for instance reflective thoughts, and the horizon that is only co-present with the theme. He used the metaphor of a circle. The theme constitutes the center of the circle, the

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<sup>2</sup> Experiences are related by mutual compenetration and fringe states are integrated within each focus state, although varying in attentiveness. Thus, the organization is not intrinsic in the structure of consciousness and there is no real disconnection between the two kinds of states.

thematic field is inside the circumference and the margin lies beyond the circumference. In summary, we can describe the structure of consciousness as below:

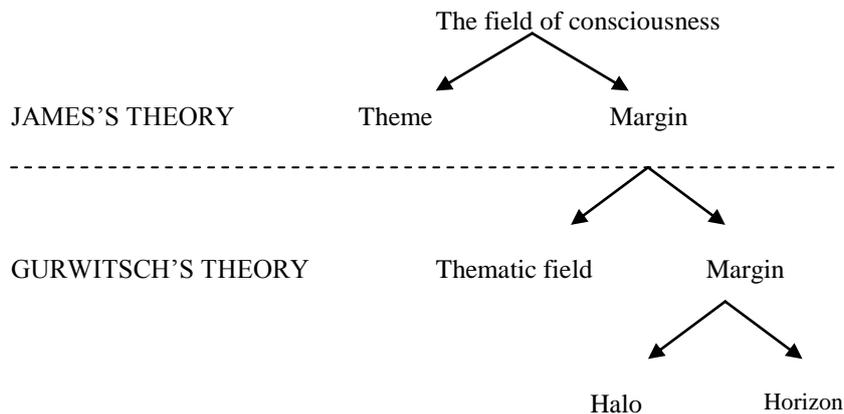


Fig. 1 The structure of consciousness

This schema does not exhaust the difference between James and Gurwitsch. The latter asserted that the margin is completely disconnected from the thematic field. In this sense, the marginal content of consciousness is contingent, because it does not need to respect any semantic constraint. This structure supposes that all the components of the field of consciousness are not experienced as equivalent, because otherwise we would not be able to order them and to choose one of them in order to behave appropriately. Three closely related factors intervene in the articulation of the field of consciousness:

- procedural factor: attention
- qualitative factor: intensity
- semantic factor: relevancy

These factors are not mutually derivable, although they may be related. Attention can be driven by the subject's deliberate decision (endogenous attention), but also by the saliency of stimuli, like their intensity (exogenous attention). For instance, a great pain will probably constitute the conscious theme, while if it hurts only weakly, it will stay at the margin. However, the most interesting feature of Gurwitsch's conception is the semantic factor.<sup>3</sup> Roughly, a state belongs to the thematic field if it is relevant to the theme,

<sup>3</sup> By semantic, I do not mean that we should understand the field of consciousness in linguistic terms or that all conscious states are propositional. Rather, I emphasize the importance of the content of the states, i.e., the intentional objects (or the noemata) of the states.

that is, if its content stands in a certain relationship with it. However, as we will see, the precise nature of this relation is not so easily defined.

In summary, marginal consciousness is contingent, irrelevant, and disconnected from the thematic field. We do not pay attention to it and it is dimly felt. Nevertheless, it allows us to always be aware of reality. At any moment, we can be conscious of three domains of reality, at least at the margin: (1) the stream of consciousness itself; (2) the perceptual environment; (3) the bodily presence.

I will focus here only on this latter aspect. Even if we do not pay attention to our own body, it is still present at the margin. In this sense, there is no more paradox because the absence at the center of the circle can co-exist with a presence outside its circumference. The consequence of the described structure of consciousness is that we are always conscious of our body: "There is no moment in our conscious life when we are completely unaware of our bodily posture, of the fact that we are walking, standing, sitting, lying down." (Gurwitsch, 1985: 31)

Therefore, Gurwitsch's theory of body consciousness is articulated into two related assumptions: *The irrelevancy hypothesis* by which body consciousness is most of time marginal and irrelevant to the thematic field and *The conscious hypothesis* by which we are always conscious of our body.

Each of these hypotheses raises several questions. The first one implies that marginal body consciousness should never affect the theme. Thus, one should be as if she was disembodied at the level of the thematic activity. However, empirical results seem to argue against this disconnection: the body does always interfere. The second hypothesis also requires some clarification. Gurwitsch did not describe the specific content of the marginal consciousness of the body and we can wonder about its nature and its precision. Once these questions elucidated, we will be able to sketch the different levels of body consciousness and their relations.

### **III. The Irrelevancy Hypothesis**

According to Gurwitsch, marginal data are by definition irrelevant to the thematic field. He provided several illustrations and descriptions of the notion of relevancy, but as far as I know, he has never explicitly given any operational definition that allows one to decide when data are relevant for the theme.

When we choose a geometrical figure as our theme, the mode of appearance of the figure varies according to whether the figure is presented on for example, a red or a yellow ground, whether the figure is surrounded by other figures, whether the surrounding figures or all of the same or of different kinds and so on. (Gurwitsch, 1964: 137)

The passage [of music] under discussion refers to those preceding. It stands in definite and specific musical relations to those other passages and derives its musical perspective from such relation. (idem, 137)

Absorbed in a scientific topic, e.g., a mathematical problem, we may think of a friend whose visit is anticipated during the course of the day. Disregarding the eventuality of our being distracted from our theme by the intruding thought, we have nothing more than two acts experienced simultaneously. If the anticipation of our friend's visit appears as a disturbing intrusion, this is because between the anticipated visit and the scientific topic engrossing our mind, merely the relation of simultaneous occurrence without any intrinsic relationship exists. (idem, 282-283)

It may well be that, as James asserts, a closing of the glottis and an interruption of the breath are experienced, either regularly or occasionally, when we are confronted with a theoretical problem for which we do not see a solution ... However, this bodily condition pertains in no sense whatever to the problem situation with which we are confronted and no change in our bodily condition affects the problem situation. No feature, tinge or aspect of the theme ... derives from the actual bodily condition or is modified by an alteration of this condition. (Gurwitsch, 1985: 29)

Besides being co-present with the theme, the data falling under the first class [the thematic field] appear, moreover, as *being of a certain concern to the theme*. They have something to do with it, they are relevant to it. Here the relationship is not merely that of simultaneity in phenomenal time, but is founded upon the material contents of both the theme and the co-present data. Such a relationship is intrinsic. (Gurwitsch, 1964: 340)<sup>4</sup>

What could we conclude? First, we need to understand that the mere phenomenal co-presence is not a sufficient condition of relevancy. Two simultaneous experiences are only related extrinsically by the phenomenal time, whatever content they have. On the contrary, the relation of relevancy is intrinsic, based on the specific contents of the related states. Secondly, the

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<sup>4</sup> Gurwitsch also qualified the relation of relevancy as a relation of "pertinence" (idem, 332), or of "affinity" (idem, 353), while irrelevant data were considered as "accessory, indifferent" (idem, 341).

relevant data interfere with the theme, modifying its visual mode of appearance or its musical perspective for instance. In other words, the theme would not be the same without the thematic field or with another thematic field. On the contrary, the marginal data do not affect the theme at all and seem to be completely disconnected from it.

Consequently, I suggest two possible conditions of the relation of relevancy. An experience A is relevant to the theme B: (i) If A belongs to the semantic network of B<sup>5</sup> and (ii) If A can affect the semantic content of B.<sup>6</sup>

For instance, if I am thinking about my family in France, then the memory of my last meeting with them seems to be relevant in both senses. On the contrary, the feeling that my legs are crossed appears as totally irrelevant. We can notice that the relation of relevancy is not reciprocal: A may affect B, without B affecting A. However, this definition of relevancy is far too wide. The notion of semantic network is unclear. Roughly, the semantic network of B includes all the states that have the same class of meaning. More precisely, following Embree (2003), we can distinguish different species of relevancy: the perceptual relation between the figure and the background, the cultural relation between for instance one utensil and its practical situation, the logic relation between different propositions inside an argument, and also the ontological relation within one domain of experiences like the inner life, the body, and the perceptual environment. However, these distinctions are not fine-grained enough for strictly delimiting the thematic field. In Gurwitsch's mathematics example, we cannot assume that all the mathematical knowledge is relevant: geometrical principles are completely unrelated to the arithmetic problem that I have to solve. Therefore, the question is to determine how far we should extend the relevant semantic network of the theme.

The second condition may help. As Gurwitsch said, "no change in our bodily condition affects the problem situation." In other words, bodily consciousness should not affect the thematic activity. I will assume that the relevant data are able to affect the theme only if they can cause its modification, in the same way as the background can alter the mode of appearance of the figure.<sup>7</sup> Still, the second condition does not describe what should be considered as an effect. Furthermore, it is controversial, as Natsoulas (1996, 1997) has pointed out. If I am attentively looking at an apple, then my body position affects my perception. He (1997) has emphasized this point by appealing to Gibson's conception of ecological vision: "Oneself and one's body exist along with the environment, they are co-perceived." (Gibson, 1979)

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<sup>5</sup> The thematic field is indeed defined as "being of a certain concern to the theme."

<sup>6</sup> The theme indeed "varies according" or "derives from" the relevant data and cannot be "modified" or "affected" by the marginal data.

<sup>7</sup> We may notice that Gurwitsch was more interested by the description than by the explanation. As Embree points out in the introduction of this volume, causation is not the primary concern for Gurwitsch.

Natsoulas referred to Gibson's notion of visual kinesthesia: each time I move, the patterns of the optical flow inform me that I am moving. Thus, the optical flow includes information about oneself as well as about the environment. However, this notion does not seem to be relevant in our discussion of Gurwitsch. Visual kinesthesia allows us to conclude that perceptual data are relevant to bodily data, but not the reverse. Nevertheless, Gibson also claimed that by perceiving my body, I perceive the world. Each perception is relative to one's own body position and state. I will provide three illustrations of this interaction between perception of the world and perception of the body.

First, the integration of touch with body position information is especially important for stereognosis, the use of touch to judge the size and the shape of objects.<sup>8</sup> Bermudez (1998) noticed that by touching an object in the night, the modification of the spatial properties of his fingers conveys new information about the spatial properties of the object. He concluded that proprioceptive consciousness is always at the periphery of tactile consciousness. Even if we do not pay attention to this proprioceptive consciousness, it still interferes with the tactile theme by allowing a better knowledge of the object.<sup>9</sup> Moreover, the misperception of the bodily position causes illusions in stereognosis. For instance, Aristotle discovered that by holding a small ball between the crossed third and fourth fingers, you feel as if the ball had doubled. This doubling occurs because the tactile input is interpreted as if the fingers were not crossed (Graziano and Botvinick, 2000).

Thus, the spatial organization of perceptual states is constructed by the subject through the interaction of visual, tactile, and kinesthetic inputs (Poincaré, 1905). For instance, vestibular information contributes to the conscious perception of orientation (Berthoz, 1997). Patients with lesions of the parieto-insular vestibular cortex—involved in the encoding of the movement of the head in space—see the world leaning the side opposite to the lesion. The effect of deviations of the vertical subjective is so strong that their photographs are skewed (Dieterich and Brandt, 1993).

The neuroscience of vision emphasizes the importance of bodily information. We are not static in the world and the objects that we see often constitute goals for actions. Vision has two main functions: recognition and action. This functional distinction can be found at the anatomical level between the ventral visual pathway (infero-temporal) dedicated to the semantic process of the object and the dorsal visual pathway (infero-parietal) dedicated to the interaction of the subject with the object (Milner

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<sup>8</sup> As Lester Embree has also told in the introduction, Gurwitsch recognized the possibility of synaesthesia and we may then assume that he would accept the possible effect of bodily experiences in the perception of objects.

<sup>9</sup> However, I agree with Gallagher (2003) that it is most probably proprioceptive information rather than proprioceptive awareness that is involved in stereognosis. As we will see later, the unconscious status of the bodily information explains how it can affect the theme without being part of the thematic process.

and Goodale, 1995). Vision for action computes visuo-motor transformations and encodes the relevant features for action into an egocentric frame of reference. These coordinates change through the action execution and always need to be updated. For instance, the position in space of the apple that you want to reach is transferred from an extrinsic (visual) into an intrinsic (proprioceptive) system of coordinates (Jeannerod, 1997). The focus of your attention is the apple that you see, still bodily information is necessary. Similarly, when you play tennis, you pay attention to the ball and not to your body (except if you are learning to play), but you will never be able to hit the ball if you do not compute its position in respect with your body.

We can provide two possible interpretations of these examples, which seem to challenge Gurwitsch's hypothesis of disconnection between the thematic field and the margin. We have just demonstrated that the representation of bodily properties makes a difference for the theme. Thus, we could conclude that in those cases, the consciousness of the body is not marginal, but belongs to the thematic field. This could be true in some cases but it cannot be true for all the phenomena described, because it would ultimately imply that most of the time the body is not at the margin of our consciousness, contrary to what Gurwitsch said. We are indeed always interacting with the world so that we always need to know the position and the state of our body. Except when these interactions are themselves marginally conscious, the body would always belong to the thematic field. In order to avoid such conclusion, we then may suggest that bodily consciousness stays at the margin because even if it fulfills the second condition, it does not satisfy the first one. For instance, my desire to eat the apple in front of me is not semantically related to the proprioceptive experience of my arm moving. As Natsoulas (1997) said, even if body information affects the theme, it is not included in the thematic process. Similarly, Gurwitsch (1985: 29) concluded that bodily condition is not "integrated into the thematic process".

We have just tried to investigate more deeply the notion of relevancy in order to understand how the bodily consciousness is only marginal, despite the almost constant interference of bodily information with the theme. The combination between the first condition of the semantic relation and the second condition of the effect relation seems to be able to restraint the extension of the notion of relevancy. However, as Gurwitsch (1964) acknowledged himself, the frontier of the thematic field remains indeterminate:

Not only does the thematic field admit indistinctness and indeterminateness, but, as previously mentioned, vagueness, and indetermination usually prevail in the more remote zones of the thematic field. A given theme points and refers not only to the 'adjoining' parts of the thematic field, that is, objects, facts, data, and items of immediate concern to it, but also to more remote zones

having comparatively little bearing upon the theme, and even beyond to items fusing with one another into an inarticulate mass. Such a mass has hardly a direct, if any, concern to the theme. Still, that fused and confused mass is referred to as somehow relevant to the theme, at least in that its indistinct and indiscriminate components having “something to do” with the theme or are of the same kind and nature ... Properly speaking, the experience of relevancy has here the sense of *indefinite continuation* rather than *continuity of context*. (Gurwitsch, 1964: 378-380)

Thus, we can still wonder whether the bodily data do not belong to the most remote zone of the thematic field. One way to avoid this conclusion is to suggest that they do not even belong to the field of consciousness. In the next part, we will see the conditions under which body information can have “something to do” with the theme without being part of the thematic field.

#### IV. The Consciousness Hypothesis

Our own bodily position, attitude, condition, is one of the things of which some awareness, however inattentive, invariably accompanies the knowledge of whatever else we know. We think, and as we think, we feel our bodily selves as the seat of our thinking. (James, 1890: 242)

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. Again, the body is the only individual mundane object which is thus permanently present. (Gurwitsch, 1985: 60)

James and Gurwitsch claimed that we are always aware of our body. I do not want to challenge this view, but rather to investigate the content of the continuous marginal body consciousness. Do I feel the presence of my body (“I have a body”) or its state (“I am sitting”)? It is right that we feel embodied, except in some depersonalization disorders where people have a sensation of dissociation from their own body. For instance, they may feel as if they were dead (Simeon et al., 2000) or floating above their own body (Grotstein, 1983). Descartes also doubted the reality of his own body: nothing assured him that he had a body, that he was not dreaming or hallucinating its existence. More recently, Putnam (1981) suggested that we could be disembodied brains in a vat and that the experience of our own body would be the result of electric impulses from a computer.

Nevertheless, neither Descartes nor Putnam refuted the fact that we have bodily feelings, they only tried to challenge the fact that there is any objective body beyond these feelings and even in this respect, they both refuted skepticism.

However, Gurwitsch went further and claimed that we are not only aware that we have a body, we are also aware of its position and its state. It does not mean that the content of body consciousness at the margin is as detailed as it would be if it were the focus of our attention. On the contrary, the marginal awareness is “dim, vague, indistinct, and indeterminate” (Gurwitsch, 1985: 27) and constitutes “merely the indiscriminate and obscure horizon, devoid of inner structure and articulation” (idem, 35). The bodily experiences are only co-present at the margin and they can be integrated into a consistent representation of the body only at the level of the thematic field. However, are we conscious of the body in all its details or only as a unitary whole without any internal differentiation?

O’Shaughnessy (1980, 1995) raised the same question. In 1980, he argued that we should be conscious of all the points of the body at any moment. He noticed that we are able to realize whatever action whenever we want without having to think about the position of our limbs. This continuous flow of information that we use should therefore always stay at the margin of consciousness. However, he acknowledged in 1995 that his theory was not parsimonious and did not fit well with reality. We consciously perceive our body as an undifferentiated whole and actions automatically trigger a precise perception of the limbs involved, while the other parts of the body recede in the awareness. Thus, proprioceptive consciousness would be similar to peripheral visual perception (Kinsbourne, 1995): visual information at the periphery of the retina is less specific, as there are fewer photoreceptors; similarly, the content of marginal proprioceptive representations is less fine-grained (I am conscious that my arm is flexed, but not of its precise angle).

Several experimental data show that we are weakly conscious of our body position, even at the margin. Most of our actions are automatic and we have a limited awareness of motor and body representations. For instance, Fournier and Jeannerod (1998) asked subjects to trace sagittal lines on a graphic tablet while they were given visual feedback projected from a computer screen on a mirror. In normal trials, the line seen in the mirror exactly matched the traced lines. In perturbed trials, a bias was introduced and subjects consistently displaced their hand in order to compensate the bias. After each trial, they were asked in which direction they thought their hand had moved. They showed poor consciousness of the signals generated by their own movements and they tended to adhere to visual rather than to proprioceptive representations. For instance, they reported the opposite direction of their actual movements (e.g., a bias of 15° to the left rather than to the right). Therefore, most of the time, we are conscious only of the general goal of the action and the visual feedback of the execution, but the specific parameters of the way we have accomplished the movement—that is, the succession of body positions—are unavailable to awareness, even at

the margin. We need thus to make a distinction between on the one hand the body representations used for action control that are fine-grained, but that are not available to consciousness and on the other hand, the body representations that are conscious, but not necessarily accurate, nor detailed.<sup>10</sup>

Gurwitsch provided a conceptual framework for understanding the status of the body in respect to consciousness. However, we have just seen that we also need to take into account the status of the body outside the sphere of consciousness. The metaphor of the circle is no longer appropriate because it implies that there is nothing beyond marginal consciousness, as it seems to include all that lie outside the circumference. Thus, there seems to be no room for unconscious bodily representations. Nevertheless, the experimental data show that we need to postulate another dimension beyond the circle, that is, unconscious body representations. We should not assimilate perception, attention, and consciousness. The body is represented on the basis of the continuous flow of sensory information, prior to any thematization in the conscious field. Even at the unconscious level, we consider the body as being mentally represented.<sup>11</sup>

The question is then to understand why sometimes bodily representations become conscious. It raises the problem of the relation between attention and consciousness: is attention a necessary condition for consciousness or can we only pay attention to what is already conscious? This question is all the more difficult that psychological literature often confuses both notions. Moreover, it goes far beyond the body domain. Gurwitsch focused on the attentional process that occurs in the field of consciousness itself. However, we should not preclude the prior existence of automatic attentional selectivity. Attention intervenes at different stages in the process of information, and more particularly, we should distinguish between the voluntary and selective attention and the low-level process of attentional filter. Various experimental results show that attention may even be a prerequisite of consciousness (Dehaene and Naccache, 2001). Conditions of stimulation by themselves, such as duration and clarity, do not suffice to elicit consciousness. For instance, people with right parietal lesions suffering from personal neglect explicitly deny the existence of the contralateral side of their body or forget it (e.g., they shave or make up only the right side of their face). Nevertheless, if you allow them to pay attention to the forgotten side, then they become conscious of it: when the two hands are crossed, such that the left hand was to the right of the trunk and conversely, the tactile extinction switches hands (Aglioti, Smania and Peru, 1999). Moreover, objects that do not fall in an attended region of the visual

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<sup>10</sup> If action execution used only conscious body representations, it would not be reliable because they are not fine-grained enough to allow us to reach any object.

<sup>11</sup> The unconscious states cannot be reduced to a flow of neural activity. They are properly mental and they do indeed far more than simply pool the sensory information. Rather, they integrate the sensory inputs from different modalities into a meaningful representation by establishing new relationships between them.

field cannot be consciously reported, as it is shown by the phenomenon of inattention blindness (Mack and Rock, 1998). The subject is required to perform a visual discrimination task at a specific location of his visual field, while another visual stimulus appears at different locations. The conditions of stimulation should suffice to elicit consciousness, and yet a large percentage of subjects failed to report the presence of the rival stimulus. In other words, body representations cannot be conscious if the subject does not pay any attention to them.

Therefore, we need to improve the metaphor of the circle in order to integrate unconscious representations of the bodily and at least two levels of attention:

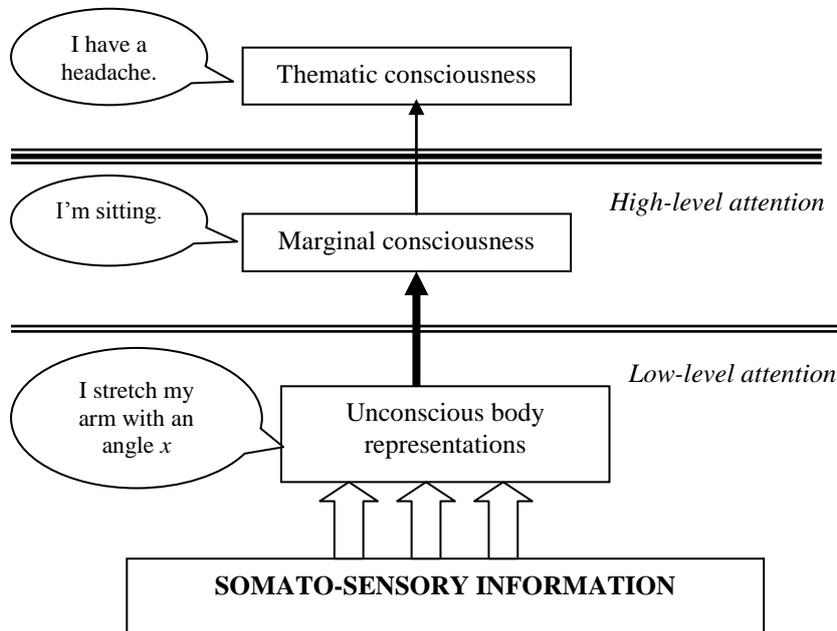


Fig. 2 Perception, Attention and Consciousness

We can now reply to the problem raised by the irrelevancy hypothesis, that is, to the fact that some body information affects the thematic consciousness. The role played by body information in action monitoring does not imply that representations of bodily position are included in the thematic process, because they are not available to awareness, marginally or not. Actually, as we have already said, the content of marginal body consciousness is too coarse-grained for action monitoring. Therefore, we can maintain the disconnection hypothesis between thematic and marginal consciousness. The nature of unconscious representations of the body and their relations to the thematic process are another question.

### V. Body schema and body image

Let us imagine that I am attending to a very interesting conference about Gurwitsch. When I enter into the room, I have a brief look at myself in the mirror: I consciously represent my body, mainly based on visual information, I think that I have shadows under my eyes and feel sorry about it. Then, I take a seat and listen carefully to the philosopher who is talking. Yet, I dimly experience that I have a body, which is complete and which belongs to me, and that I am sitting. During the talk, my pen falls and I bend down in order to grasp it. The sensori-motor system encodes the position of the pen relative to my body and monitors my movements in order to catch it.

Thus, far from being marginal the body constantly intervenes in our life involving different kinds of representation that vary in respect with several dimensions. We may summarize this example as below:

	<b>Consciousness</b>	<b>Specification</b>	<b>Dynamics</b>
<b>Looking at myself in the mirror</b>	Thematically conscious	More or less detailed	Long-term and short-term representations
<b>Focusing on the topic of the conference</b>	Marginally conscious	Body as a whole	Long-term and short-term representations
<b>Grasping the pen</b>	Unconscious	Very accurate	Short-term representations

Fig. 3 Reflexive body, Marginal body and Unconscious body

Head and Holmes (1911) suggested the existence of three kinds of body representation: the *body schema*, which reflects the modifications of position that are not yet conscious; the *superficial schema*, which is a central map of somatotopic tactile information; the *body image*, which is a plurimodal conscious representation of the body. I thus suggest to look for the function of each of these representations.

As we have already seen, Milner and Goodale (1995) distinguished vision for recognition (“What”) and vision for action (“How”). Similarly, we can distinguish between the body schema and the body image (Gallagher, 1995). This functional distinction could also be applied to the representations of the body. Some neuropsychological results indeed show a double dissociation between patients with “numbsense” who cannot identify their body parts while they are still able to point them with their hand and deafferented patients who recognize them without being able to reach them (Paillard, 1999). Therefore, body representations differ with respect to the semantic or pragmatic nature of their purpose. In this sense, the body image replies to question “What” (What is this body part? What are the position and the state of my body?), while the body schema replies to the question “How” (how to use my body?). Body schema allows us to walk, to grasp a

glass or to catch a ball, while body image is oriented toward the semantic recognition of the body.<sup>12</sup> From this functional difference, follow several distinct features of these representations that I will briefly describe.

The body schema is a dynamic sensori-motor representation based on the continuous flow of somesthetic and visual information. If you want to move, you need indeed to know very quickly the position of your limbs at every moment. According to Libet et al. (1991), only cerebral activity that lasts more than 500 ms is able to elicit awareness. Therefore, as a short-term representation involved in action monitoring, body schema is not available to consciousness. On the contrary, body image involves long-term conscious representations that include perceptual, conceptual, and emotional components. It relies on different conceptions of the body<sup>13</sup>:

- “the innate body”: innate internal model of the body at the origin of the phenomenon of phantom limb in aplasic patients (Melzack, 1990)
- “the usual body”: representation of the body stored in long-term memory
- “the actual body”: visuo-spatial representation of the body
- “the semantic body”: conceptual and linguistic representation of the body
- “the cultural body”: social representation of the body and its evaluation by a specific culture

We can become aware of each of these body images. However, when they are only at the margin of the field of consciousness, they are less organized and articulated and we can have access to full-content body images only if we introspectively pay attention to our body.

Despite their differences, the body image and the body schema are intimately related. The body image does indeed structure the body schema, while it is itself partly the result of the representation common to the successive body schemata (O’Shaughnessy, 1995). However, it does not follow that the body image is only the part of the body schema that becomes available to awareness through the filter of attention. Their content and their functions are clearly distinct and should not be confused.

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<sup>12</sup> It may play a role for action, but only when it requires having a conscious and reflective behavior, like in motor training (Gallagher and Cole, 1995).

<sup>13</sup> The distinction between the usual and the actual body is made by Merleau-Ponty (1945).

### Conclusion

The body can be apprehended both as a point of view on the world and as an object within this world. The thematic consciousness, based on perceptual, conceptual, and emotional body images, emphasizes this latter aspect. However, we scarcely focus on our body because we are more involved in the external world than in ourselves. Nevertheless, we cannot have any interaction with mundane objects if we do not take into account the body itself. The implication of the body does not need to be conscious, and even our efficiency depends on the unconsciousness of sensori-motor body representations. Thus, the body schema expresses the body as an agent in its continuous relation with the world. Yet, the question of body representations cannot be settled by this dichotomization between conscious and unconscious processes, between object and subject. In-between these two levels, the marginal body consciousness plays its own role. Like the body schema, it is continuously present, always in the background of consciousness. Like the body image, it represents the body as a whole and does not intervene in action monitoring. Marginal bodily consciousness manifests the feeling that my point of view on the world is always anchored in this body that belongs to me.

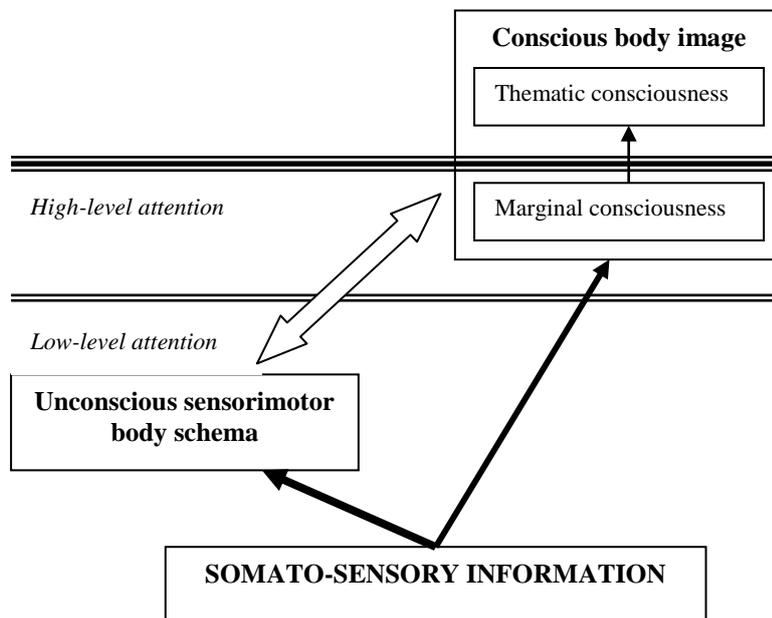


Fig. 4 Body representations

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