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Recensioni

Frédérique de Vignemont
Mind the body. An exploration of bodily self-awareness
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Embodied cognition is a theoretical perspective that emphasizes the significance of the body in cognitive processing, highlighting the ongoing interaction between the body, environment, and mind. Aligned with this perspective, *Mind the body* seeks to thoroughly explore the mind-body relationship, with a particular focus on the concept of bodily ownership. In particular, it aims to provide an account of the sensory, motor, and affective foundations of bodily awareness. This exploration includes examining the (often dramatic) characteristics of various pathological disorders related to bodily awareness and the peculiarities of certain perceptual illusions. One such is the *Rubber Hand Illusion*, where a person experiences a sense of ownership and sensations toward a rubber hand when it is placed in a visible position and aligned with their body, while being stroked simultaneously with their hidden real hand.

De Vignemont addresses the theme of perception, advocating for multisensory integration that occurs solely at the perceptual level, without cognitive penetration. According to this view, the perceptual system binds together sensory information related to the same object without relying on conceptual individuation. In the rubber hand, the illusion arises directly from the manipulation of immediate sensory inputs, without necessitating cognitive interpretations by the participants. The identification of the rubber hand as one's own results from visuo-somatosensory binding.

Furthermore, she advocates for a classic position within contemporary research on cognition: the primacy of vision over other sensory modalities. Vision is not only extremely accurate and reliable compared to other senses – serving as the primary source of information about the external environment – but it is also less susceptible to interference from other sensory modalities. Additionally, the author argues that vision is crucial for compensating for the imperfections of other sensory information, particularly those from bodily senses. By integrating with proprioceptive input, vision ensures a stable representation of one's body, which is essential for calibrating tactile processing and navigating the environment. Its importance is underscored by its ability to guide movement even in the absence of proprioceptive information, such as in cases of neuropathy.

Moreover, while body perception is often considered sufficient for forming a representation of our body, de Vignemont highlights the fundamental role of vision in creating a reliable and accurate mental representation. For example, in early-blind individuals, the lack of visual input leads to altered perceptions of body metrics and configurations. Vision is also crucial for awareness of other bodies, a key element in social perception: understanding others begins with perceiving their bodies and actions, which allows us to infer their objectives, emotions, and psychological states. Additionally, this awareness may enhance our own body representation. For instance, individuals born without upper or lower limbs (amelic subjects) can experience phantom limbs. Since the innate body template alone cannot provide the detailed characteristics of phantom limbs, it is plausible that visual awareness of other bodies with two arms and two legs contributes to this phenomenon.

Embodied cognition holds an optimistic view that bodily information is always sufficient and reliable for shaping our bodily experiences and representations. However, de Vignemont's study challenges this assumption, arguing that it is not always the case. She first examines the concept of the "body map", which represents the structural organization of the body. Without this frame of reference, bodily sensations would be perceived as isolated points, lacking spatial coherence. The body map allows for a rich spatial content and underpins the sense of bodily ownership. Notably, the concept of bodily ownership is distinct from the feeling of bodily presence: while it is necessary to feel one's body as being here to perceive it as one's own, this condition alone is not sufficient. Ownership involves more than just perceiving the body as spatially delimited; it entails a sense of "myness": a subjective experience of ownership over the physical body that allows one to perceive and recognize the body as belonging to oneself.

However, because the body map is a representation, it can depict one's (biological) body accurately or in a distorted way. This distortion occurs in disownership syndromes, a broad range of pathological conditions affecting bodily awareness. For example, individuals may report sensations extending beyond the actual limits of their bodies, as seen in the phenomenon of phantom limbs in amputees. Alternatively, individuals might perceive their body differently from the one they actually have. In some cases, the body map fails to represent one or more parts of the body internally, causing those parts to be perceived as alien as in somatoparaphrenia, where an alien limb may be attributed to another person or personified. Conversely, there are cases where parts of

someone else's body are mistakenly self-ascribed (embodiment delusion). Erroneous bodily experiences can also be induced in experimental settings by exploiting perceptual illusions.

The in-depth examination of disownership syndromes and perceptual illusions reveals the complexity and nuance of bodily representations. In her analysis, de Vignemont proposes a model that extends beyond the traditional body image-body schema dichotomy. The body image refers to a conscious percept and concept that includes affective elements, while the body schema involves an unconscious representation associated with motor functions and sensory abilities. De Vignemont suggests a distinction in body mereology between bodily experiences and actions: actions require an integrative representation of the body, where multiple body parts work together to perform movements, whereas the localization of bodily experiences is more specific and focal. Therefore, the body map used for actions is inadequate for accurately pinpointing bodily experiences. To address this, she advocates for two types of body maps: a purely descriptive body map that allows for precise localization of sensations, and a directive body map, described as «an integrative representation of the body that brings effectors together into functional units» (p. 161), enabling active interaction with the environment.

Furthermore, the examination of both the *Rubber Hand Illusion* and the use of prostheses among amputees reveals a double dissociation. In the *Rubber Hand Illusion*, participants show defensive movements when the rubber hand is threatened but find it difficult to plan instrumental movements. In contrast, most amputees consistently use their prostheses for planned movements but perceive them as foreign. This suggests a further division of the action-centered body map into two types: a working body map (involved in instrumental movements) and a protective body map (associated with self-defense). The working body map is specialized in the visuomotor transformations necessary for interacting with the environment; it integrates tools during their use and recalibrates when they are no longer used, without creating a sense of ownership. In contrast, the protective body map remains unchanged during tool use and serves as the default body map.

In the last part of the book, the analysis focuses on the *protective body map*, which underlies the sense of bodily ownership and is responsible for representing the body as something to be defended. This representation is altered in disownership syndromes: body parts included in the map are perceived as one's own, while those excluded are considered alien. This can lead to phenomena that challenge common understanding, such as xenomelia, where individuals feel disgust or hatred towards certain healthy body parts, desire their amputation, and show no physiological response when the rejected limb is threatened. This extreme case illustrates how the representation pertains not to the actual body but to a virtual one – a possibility.

This hypothesis also highlights the emotional aspect of the *protective body map*: the body perceived as one's own is the one we direct our emotional feelings toward and seek to protect. In this sense, bodily experiences align with narcissistic principles, seeking to ensure what is best for the organism. The affective significance of bodily boundaries is primarily influenced by pain, and observations of pathological disorders further support this hypothesis. For example, in cases of pain deprivation, individuals with congenital insensitivity to pain perceive their bodies as external objects, indicating a deficit in bodily ownership.

In conclusion, *Mind the body* consistently draws on insights from cognitive science and clinical (neuro)psychology to explore how the body is represented across perceptual, cognitive, motor, affective, and social domains. Through her examination of disownership syndromes, de Vignemont addresses the limitations of existing theories and proposes a new model to better explain bodily self-awareness and ownership. The study also underscores the primacy of vision, a concept supported by rehabilitation strategies designed to restore perceptual awareness and motor control in individuals with distorted body representations and erroneous bodily experiences. This highlights the importance of integrating *embodied cognition* with rehabilitation strategies, emphasizing the critical link between theoretical understanding and practical application.

Eleonora Casetta
Dipartimento di Psicologia e Scienze Cognitive
Università degli Studi di Trento