Roles of the Body in Learning

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by

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Introduction

In recent years research in fields as diverse as philosophy, pedagogy, psychology, and anthropology has shown that the knowledge people possess in practice may not always be linguistically expressible[1]. Part of what practitioners know can certainly be and normally also is formulated in textbook knowledge as well as in rules of thumb, sayings, and the like, but still, a large part is more readily understood as made up of skills, 'know how', 'ways of going about the practice', and so on, which cannot be adequately explicated in words. Often, for example, the experienced nurse can tell that something is wrong with a given patient without being able to say exactly what and without being able to formulate the grounds for her judgement (Josefson, 1988, Benner, 1984). Likewise, the skilled driver adapts his driving to the concrete situation and for example knows how to react to a sudden danger like a car swerving towards him or a child running out in front of the car without recourse to linguistically expressed or expressible knowledge like the following of a rule (cf. Dreyfus & Dreyfus, 1986). Even in fields as 'objective' and 'theoretical' as the natural sciences, practitioners report that through practice they acquire a "feel for good science" that is not expressible in words, but that is essential to the way they conduct their own research as well as to the way they judge the work of others (Kanigel, 1986, p. x). Actually, in my opinion, the knowledge of practitioners is not pieced together of a linguistic and a practical part, each acquired by the practitioner more or less independently from the other. Instead, as I see it, the 'knowledge in practice' of the practitioner is a synthetic unity of linguistic and practical knowledge as well as of experience or 'knowledge by acquaintance' with concrete situations occurring in the practice. More precisely, in my opinion the knowledge of the practitioner is an integrated whole that goes far deeper than the interrelated parts themselves in that it gives the full meaning to the linguistic knowledge and makes certain actions seem the relevant ones to undertake, thereby making possible the 'know how'. The 'knowledge in practice' of the practitioner is, I think, best understood as a kind of perspective on the situation that lets features and aspects of a given situation stand out as important and relevant to the activities of the practitioner. It is because of having a perspective like this that a nurse can sometimes immediately see that there is something wrong with a patient without being able to say on what she bases her judgement: With the perspective of her 'knowledge in practice' the patient simply *looks* to be 'in a bad condition' – this is the way he presents him- or

[1] Cf. for example Benner, 1984, Dreyfus, 1992, Dreyfus & Dreyfus, 1986, Lave & Wenger, 1991, Schön, 1983 and 1987, Journal of Nordic Educational Research, 1997, Göranzon & Josefson (eds.), 1988.

herself to the action-directed attentiveness of the nurse. Likewise, the perspective of the skilled driver lets him adjust his driving to that of other drivers, without him necessarily noticing anything specific about the movements of their cars – the car ahead may just look to be 'about to make a left turn', even though the driver has not yet so signaled. And the 'feel for good science' that the scientist acquires through practice is, I would say, precisely this kind of perspective that lets scientific problems arise and stand out as interesting to investigate and lets the research of others present itself immediately as for example 'a breakthrough', 'superficial', or 'wrongheaded'. Be that as it may, the question arises how knowledge that is not linguistic is learned, since, obviously, it cannot be (directly) passed on in verbal communication. The obvious answer, 'through experience in practice', is insufficient, though true, in that it leaves the concepts 'experience' and 'practice' unaccounted for and in so far actually does not explain how the knowledge comes about. The purpose of this paper is to give part of the required more elaborate answer by pointing at the contribution our bodily being has in the learning of non-linguistic knowledge. I shall do this by first introducing a distinction between 'intentional learning' and 'learning as we go along', and then, with two further concepts, those of 'body schema' and of 'affordance', try to show the importance of the body at three different levels: the level of action, the level of the structuring of the way given situations present themselves to us, and the level of 'the learner'. In conclusion, I shall present the claim that the traditional epistemological dichotomy between mind and body must be rethought because our bodily being is integral to learning and to what is learned, and so is integral to a domain traditionally thought to be purely mental.

1. 'Intentional learning' and 'learning as we go along'.

Much of the knowledge we possess, linguistic as well as non-linguistic, is acquired whilst we have our full attention directed precisely towards the acquisition of it or at least are very aware that we are now acquiring it. Often, I think, it could not be acquired in any other way. This is what I call 'intentional learning', hereby not meaning that we necessarily *intend* to learn whatever is so learned (though we often do intend it), but that we are *aware* that we learn. Examples of learning of this kind vary from the acquisition of basic skills in early childhood to the acquisition of much of the specialised knowledge of professionals and scientists. A student of physics is very aware of his struggles to understand the textbook and to solve the problems included at the end of each chapter, but the child learning to walk is hardly less aware of his efforts as he takes a few steps, stumbles, falls, gets up, and tries again. And, to give an example of non-linguistic knowledge acquired by professionals, the skilled physical

therapist is able, on examining a patient, with her hands to feel where it hurts for him – a skill she, to my mind, must have been aware of acquiring through her training, though she is not able to articulate the knowledge of her hands in any adequate way: She can put words to what she experiences *with* her hands, *i.e.* she can say things like "here is an inflammation/an oedema/a chronic muscle tension" and so on, but she cannot articulate the *experiencing of* her hands – that whereby she knows that this is so – simply because there is no 'whereby'; she directly feels states of affairs like these in the patient. If pressed, she will probably say something like "That's the way it feels" or "It is too soft here in exactly the way of an oedema". Quite a lot of the tacit knowledge of practitioners is, I think, acquired intentionally, so that the practitioner is aware (and can say) *that* he learns, which means that he is also able at *some* general level to describe *what* he is learning (*e.g.* 'to drive a car', 'to swim', 'to ease inflammations through physical therapy'), but since his knowledge is of a non-linguistic, experience-related, and in many cases bodily kind, he is still unable to formulate in any precise manner in what the learned *consists*. However, I wish to argue that a large part of our knowledge – including, I shall contend, much of the most basic hereof – is *not* acquired in this way and maybe, even, it could not be. Instead, we learn it whilst our attention is directed 'outwards', *i.e.* not towards ourselves and our possession of knowledge, but towards the concrete activity we are undertaking – we pick up this kind of knowledge without being mentally aware, neither *that* we learn nor that there is something *to be* learned, as part of our way of going about the practice we partake in. An example of this is the skill we all have, in every situation of conversation, of placing ourselves immediately, without thinking about it, at 'the appropriate distance' to the person we are talking to[2]. This 'appropriate distance' is not given just by the loudness with which the interlocutors speak to each other and their respective hearing abilities – rather, the loudness with which one speaks will often be regulated by what in the given situation counts as the 'appropriate distance' – but varies with the situation: One stands closer to friends and family than to strangers, but in a crowded bus or in the reading room of the library where one must be quiet, it can be, not only acceptable, but the only right thing to do to speak to a stranger at a closer distance than that at which one would normally speak to even the best of friends. The skill of distance-standing is not acquired intentionally, *i.e.* we are at no point aware of learning where to stand in a conversation, much less are we explicitly taught so by others – actually, very few people are even aware *that* they place themselves at a certain distance to others dependent on the situation, until this is pointed out to them

[2] I owe this example to H. Dreyfus, personal communication.

by others or they experience a 'breakdown situation' where someone stands much too close or much too far away for them to feel comfortable about the conversation[3]. This skill is acquired, instead, 'as we go along' through the many conversations we participate in from our earliest childhood on – conversations, in which we are focused not on where and how we stand, but on the interlocutor and on what is being talked about. My claim is that a lot of the most basic of our knowledge (*i.e.* knowledge about the way the natural and cultural world is as well as about how one behaves in it) is acquired in this non-propositional, background, inattentive fashion. We do not as children *think* that the earth is stable beneath our feet[4], nor do we *notice* that people, books, furniture, toys etc. have relatively stable appearances and stay close to the earth so that they do not for example disintegrate every once in a while or suddenly, out of nowhere, without any cause acting upon them, start flying around the room. Rather, knowledge like this is acquired 'as we go along' as an unnoticed part of the activities we undertake (and others undertake with us): As *practical prerequisites* (not theoretical justifications) for these activities, facts as these are incorporated into our practical knowledge in the course of our doings, be these naturally (instinctively) initiated, like the baby trying to raise its head while lying on its stomach, or culturally, like the parent reading a book to the child. And, I wish to add, facts as these are incorporated in a *bodily* way – they are part of the way we, as bodily creatures, act in our (natural and cultural) environments; they are part of what our bodies *know*, not representationally, but actively[5].

[3] At international conferences it is a well-known phenomenon that Southern Europeans 'back' Northern Europeans up in a corner or around the room – the distance at which one speaks being culturally variable, the former is trying to get close enough to have a conversation whilst the latter is trying to get far enough away to do the same. The interesting point to notice is that often the interlocutors will be so engrossed in the conversation that they do not notice their movements about the room, and only have a vague feeling that 'something is wrong', caused by the inappropriateness of the distance at which they talk, but not experienced by them as so caused – they may as well pin the problem down to the other person's not seeming to understand what they are saying, their own difficulties in expressing themselves adequately, or the other person's being more or less incomprehensible. As I shall argue below, this is due to the fact that the body 'takes over' in cases such as that of distance-standing, so that when everything is going well, we are not even aware of there being a *question* of things going well or not (of there being an appropriate distance), and, conversely, once things are not going so well anymore, we to begin with often just feel a not very specific tension that we only if the state of affairs persists and maybe worsens are able to determine the cause of. Cf. Buytendijk, 1974, for a similar observation concerning the reading of a book when the lighting is bad.

[4] In areas without frequent earthquakes.

[5] The development of the child's mastery of its own body and the philosophical importance of this development for the child's active understanding of itself and its world have been very interestingly analyzed by M. Sheets-Johnstone, 1999. She emphasizes that "In the beginning … we do not *try* to move, *think* about movement possibilities, or put ourselves to *the task* of moving. We come straightaway moving into the world; we are precisely not *stillborn*." (p. 136.) In other words, "movement is there prior to "I move."" (p. 138.) These points seem to me very fundamental and at the heart of our possibility of the bodily 'learning as we go along' which I have just been describing: Only because

At this very basic level, 'learning as we go along' has a very important role to play. I want to claim, however, first, that 'learning as we go along' takes place at all levels of knowledge acquisition and that it is always part of learning, even when some of what is learned is learned intentionally and perhaps also linguistically, and, second, that the most sophisticated 'knowledge in practice' can only be learned 'as we go along': As regards the first claim, even when one is intentionally focused on learning some specific piece of knowledge or getting the grip of a certain aspect of the practice one is trying to master, one is always learning *more* than this. One is learning how participants in this practice talk to and about each other as well as how they talk to and about people outside the practice, one is learning what can and what cannot be said about the activities undertaken in the practice, and, quite as important, what can and what cannot *be done* – all in all, one is getting a sense of the practice, of what goes on in it, of who the practitioners are, who counts for what and what counts as good vs. bad ways of acting in the practice (cf. Lave & Wenger, 1991). Some of this knowledge is probably acquired intentionally, e.g. one definitely notices a reprimand one gets for not behaving appropriately in some situation, but a lot of it is, I think, just picked up as ways of acting in somewhat the same way as children pick up expressions and phrases of their first language and ways of behaving towards people (including distance-standing) in given situations without being aware thereof, simply doing as their parents and other role models have done before them on similar occasions[6]. To a large extent, the 'feel for' a given field mentioned above, be this

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movement is possible without a conscious, mental 'mover' that wills them is it possible for the body to attune itself to the circumstances and demands of a given situation in a way that does not involve our mental awareness. Sheets-Johnstone stresses the importance of tactile-kinesthetic feelings and a kinesthetic consciousness, however, and says, for example, that "Movement awakens transcendental subjectivity in the form of kinesthetic consciousness" (s. 138) and that "the typically habitual and qualitatively marginal [adult ways of moving] were at one time focal; hence, originally, in assaying or in successfully accomplishing any movement for the first time, we were aware of its felt qualitative character" (p. 142.) I take this to mean that in her opinion all movements have been learned intentionally in the sense here discussed (which does not imply that the learner *intended* to learn them but only that he was aware of learning them whilst doing so) whereas I would suggest that many of them were acquired 'as we go along'.

[6] The importance of role models and of imitation in connection with 'learning as we go along' can, I think, hardly be overestimated. In this context, Sheets-Johnstone, 2000, gives an interesting and, I think, convincing argument to the effect that the capacity we as grown-ups have of imitating others and thereby of learning from them – a capacity quite essential in most or all skill-learning situations – has its developmental roots in the capacity of the infant to imitate adults, and, further, that the former capacity can only be accredited its full epistemological significance in relation to the latter. My understanding of the phenomenon of imitation itself diverges somewhat from Sheets-Johnstone's, however, in that I understand the phenomenon in terms of a body-schematic attuning (cf. below) of oneself to the movements of others; this attuning in many cases occurring 'as we go along', without the awareness of the agent. Sheets-Johnstone, on the other hand, explains imitation in terms of a "kinetic-kinesthetic matching" (p. 354) that, as I understand it, necessarily involves a kinesthetic consciousness of the

physics, nursing, the movements of traffic, or whatever, is in my opinion acquired 'as we go along', without the mental attention of the practitioners, as part of their way in practice of relating actively to the field in question.

As regards the second claim, that the most sophisticated 'knowledge in practice' is and can only be acquired 'as we go along', I wish to postpone my justification for asserting this until I have discussed the roles of the body in learning since this discussion is a prerequisite for presenting my grounds for holding the claim in question. I therefore now turn towards the central theme of this paper.

2. 'Body schema' and 'affordance'

To begin with, I would like to introduce two concepts that I find of big importance in understanding the roles of the body in learning. The first is the Merleau-Pontian notion of a 'body schema' through which our actions in the world are coordinated and the second is the Gibsonian term 'affordance' that signifies the possibilities specific things and in an extended sense features and aspects of the concrete situation afford for a given living being.

When Merleau-Ponty speaks of a 'body schema' it is very important to realise that he does not mean an image of the body[7]. Neither does he mean the sum of physiological input from the body, nor an unconscious 'program' realised in any definite way in our brains, irrespective of the situation in which the 'program' is 'run'. Nor, for that matter, does he mean a pattern of behaviour to which we consciously try to conform. Rather, the body schema is to be understood as a non-conscious, active, dynamical living of the body as a whole *with* its interrelated limbs *relative to the concrete action one is undertaking, as well as to other possible actions.* The body schema is not independent of incoming physiological stimuli, but on the other hand it does not depend on such stimuli in any definite, one-to-one way – instead it structures and modifies the physiological input into a dynamical synthesis formed by the involved participation of the agent in the concrete situation. In the words of S. Gallagher, the body schema is a "practical attunement of the body to its environment" (Gallagher, 1995, p. 237), or, as I would also like to put it, it is a *focusing of the body on the concrete task* whilst holding open the possibilities of other ways of acting. The body is "polarised by its tasks", has "*existence towards* them", thereby "collecting [itself]

agent's body which will not be there in 'learning as we go along' as I have described it, though it *will* be present in intentional learning. Cf. also Sheets-Johnstone, 1999, p. 260ff.

[7] This is obscured by the fact that the English translation of *Phenomenologie de la Perception* mistakenly renders Merleau-Ponty's concept 'schema corporel' precisely as 'body image'. Cf. Gallagher, 1986, for an illuminating discussion of the differences between the body schema and a body image.

together … in the pursuit of its aims." (Merleau-Ponty, 1962, p. 101, italics in original). And, it should be added, the way we know our body in action is precisely *through* the concrete task, through our existence towards it – in action, we do not feel the body or observe it; instead, we know it by what we undertake with it, *i.e.* we have a 'lived familiarity'[8] with it through the situation and the actions we perform in these situations. As Merleau-Ponty says: "[M]y body appears to me as an attitude directed towards a certain existing or possible task…[I]ts spatiality is not … a *spatiality of position*, but a *spatiality of situation*. If I stand holding my pipe in my closed hand, the position of my hand is not determined discursively by the angle which it makes with my forearm, and my forearm with my upper arm, and my upper arm with my trunk, and my trunk with the ground. I know indubitably where my pipe is, and thereby I know where my hand and my body are…" (ibid., p. 100, italics in original). In other words, our bodies are known to us, not as sensed objects, but as active, living ways of being in the world.

Examples to illustrate the existence of a body schema as well as its functioning are most easily given by considering situations in which the body schema is inadequate relative to the situation, *i.e.* where the focusing of the body on the concrete task is faulty in some way. The well-known phenomenon of phantom limbs is here a good case in question. People who have had a limb amputated often report that they can still feel it and that it hurts the way it did before the amputation[9], and, which is more important in this connection, they actually, without thinking about it, body-schematically as I would put it, *act* as if the limb was there (Merleau-Ponty, 1962, p. 76ff. and p. 101 footnote 2). Thus, the man whose leg is missing will get up and start walking across the room, only to realise as he falls that the leg is not there. Here, his body schema, his way of going about the task of getting from one side of the room to another, has not accommodated to the new state of affairs, so that, even though he certainly *knows* mentally that his leg has been taken off (*i.e.* this is part of his body *image*), he still acts as if it had not. The explanation of this is that actions resulting from the exercise of a skill one possesses are not consciously controlled or supervised

[8] An example to illustrate the 'lived familiarity' that we in my opinion have of our actions as different from feeling, sensing or observing the body performing these actions can be given by noting the way we normally know the gestures with which we commonly accompany our words. Very often one is not aware that a certain gesture is typical of one and, when told so by others, one cannot recall routinely or maybe ever moving like that, because one has not felt, sensed or in any other way observed oneself in the process of the gesticulation. Only when one tries the movement can one feel that 'yes, this is a familiar way of moving for me'. It is exactly this familiarity with the action *performed*, not observed, but lived, that I try to capture with the concept 'lived familiarity'.

[9] This does not contradict my statement that in action one does not feel ones body. It just means that the body schema persists in existence even though the person is not at the moment engaged in action and thus can be aware of his body. This persistence, I would add in conformity with the above said, is not the persistence of a static entity, but of the *possibilities* of action that the body schema makes out.

– actually, they are not thought about at all, consciously *or* unconsciously[10]. Instead, they are performed by the body itself, as part of the dynamic, involved body-schematic response to the possibilities and demands of the situation.

The body schema is not, however, just a practical coordination of the limbs of the body, as is seen, partly from the fact that the body schema is also a certain *style* with which the action is performed, partly by the observation that the borders of the body schema are very often not made up by the borders of the physical body, but are defined by the concrete activity of the agent and the skill with which he is performing this activity. As regards the first point, a given action can usually physiologically be performed in more ways than one, or at least with variations of some of the physiological features, and it is the style of the individual, under the influence of whatever social and cultural factors might be of importance, that together with his skill determines the specific way the action is actually performed. Using Gallagher's example, catching a ball in the course of a game is not determined solely by physiology, but to a great extent also by the individual style of the person in question. In his words: "[T]he body schema is much more selectively attuned to its environment than what physiology will allow." (Gallagher, 1995, p. 236). As to the second point, maybe the most perspicuous illustration hereof is the way amputees can make use of a prosthetic device in their actions – after getting used to it, the amputee will use the prosthetic limb without thinking about it; he will act with its help and in accordance with having it, *i.e.* the space of possibilities opened up by the body schema will include actions with the artificial limb on a par with the other, natural, limbs. A given situation, in other words, will present itself as demanding and making possible actions in which the prosthetic device plays its part in integration with the rest of the physical body.

[10] Consciousness plays different roles in the exercise of different skills. In some skills, like walking, one need more or less only *be* conscious in order to exercise them (and even this might be contested with reference to for example sleepwalking), but one can have one's mental attention fully directed elsewhere, which means that the body schema alone is fully responsible for the action. In others, like tennis playing, one's consciousness is directed fully at the activity so that the body schema is 'helped' in its functioning by the attentiveness of one's consciousness. In my opinion, there will be a continuum of cases between these two extremities, with more or less consciousness involved in the exercise of specific skills. The important points to notice, however, are, firstly, that in every case of skill mastery the body schema is the basis of the action undertaken and, secondly, that the consciousness involved is never of a controlling, supervising kind, *i.e.* it is not representative or thinking, but is, rather, to the extent that it is there at all, directed outwards and is totally absorbed in the situation. It has been suggested to me by H. & S. Dreyfus (personal communication) that the degree of consciousness necessary in the exercise of a given skill is a matter of the width of the margin for error so that the narrower this margin is the more focused one's consciousness has to be on the activity – focused, that is, in the non-representational, absorbed way just described. The width of the margin of error will, of course, not only be determined by the skill itself, but to a large extent also by the situation – walking along a narrow mountain ridge one needs all the absorbed, non-representational, outwardly directed consciousness one can assemble.

This is so, because the artificial limb has been integrated, or, as I prefer to put it, stressing the bodily nature of the phenomenon, *incorporated* into the body schema. It has simply become part of the way the amputee actively and dynamically relates to and engages in the world.

The possibility of incorporating a device into the body schema is, however, not restricted to special cases like artificial limbs, but can also be exemplified by the skilled use of a tool or even the wearing of a large garment. As Merleau-Ponty notes (Merleau-Ponty, 1962, s. 143), a woman having a large feather in her hat is, once she is used to wearing the hat, able to go through a doorway in exactly the same unthinking and unrepresentational way as she would without the hat: The feather being incorporated into her body schema, she just automatically, without even noticing it, takes account of the feather and ducks the appropriate measure. Likewise, the skilled driver does not have to think about the size of his car in parking it or going through a narrow opening (unless the space is *very* limited); he simply does it, because the car is incorporated into his body schema in his driving. Another aspect of this kind of body-schematic incorporation is the sensing of the world through the incorporated device: Both Merleau-Ponty and M. Polanyi have independently of one another pointed to the fact that the blind man's stick given training is incorporated into his body schema[11] so that he comes to perceive the world, not by feeling the movements of the stick in his hand, but by sensing directly with the end of the stick – he feels the stick touching the kerb, not the resulting jerk of the stick in his hand (Merleau-Ponty, 1962, Polanyi, 1964)[12]. In the same way, the skilled driver does not feel himself jumping up and down in the seat of his car – he feels the unevenness of the road in the wheels of the car. All in all, examples as these, together with the former examples, show that the body schema is not just a coordination of the limbs of the body, but is a way of going about the world as active, dynamic beings engaged and often absorbed in activity.

The second concept that I would like shortly to introduce is the concept of 'affordance'. This term was first coined by J.J. Gibson (Gibson, 1979, 2nd ed., 1986). The point of it is to stress that for a given living being concrete objects, constellations of objects, and, less materially, features and aspects of the environment *afford*

[11] Polanyi does not use this word, but only speaks of incorporation into the body.

[12] Though Merleau-Ponty and Polanyi agree on this phenomenological description they disagree on the point whether the impulses of the stick are still noticed by the blind man at some subsidiary, but still conscious level. This is the view of Polanyi, who argues that the blind man knows *from* these subsidiarily noticed impulses *to* the phenomenological feeling of for example the kerb. Merleau-Ponty, on the other hand, considers this description a logical (re)construction that has no justification in the phenomenology of the situation.

different possibilities (good or bad) for the living being such as eating, drinking, sitting, lying down, being eaten, fighting, etc. As Gibson notes, the affordances of an environment are relative to the animal in question, but are not therefore 'subjective' – it is an objective fact, for example, that cabbage affords eating for the rabbit, just as it is an objective fact that cabbage *does not* afford eating for the lion. The relativity of affordances is objectively given with the animal and the environment: "An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer." (Gibson, 1986, s. 129) Gibson stresses that the fact that something is an affordance for a given animal is not dependent on the animal being aware of this – the affordance of a fox for a rabbit is being eaten, whether the latter knows this or not (or, maybe more relevantly, whether it notices the fox or not). In the context of this paper, however, this point, though important in itself, is of less interest than two other observations: Restricting myself to human beings, though similar points can be made concerning animals generally, firstly, the affordance of something for someone is to a large degree a question of the bodily nature of human beings in combination with the (naturally and culturally determined) skills possessed by the person in question. And, secondly, the affordance of something, though it is not dependent hereon, in fact normally is directly perceived for what it is and, at least as important, is directly *responded to* without the mediation of thinking, given a certain level of body-schematic acquaintance with the world. To take the latter first: A chair affords sitting *and it looks it* – it looks it to the extent that one often responds body-schematically to the affordance of the chair without being aware of this at all, only realising that one has sat down when one is already in the chair. Of course, things can look different from what they are, *e.g.* a door made of transparent glass may look as if it affords passing when in fact it is closed, and one can get badly hurt by responding to the perceived affordance. But the interesting point to notice in connection with the discussion of our body-schematic way of relating to the world is exactly *that* we respond directly, without reflecting, to the perceived affordances of the environment, thereby demonstrating the fundamental role of the body schema as compared to reflection, representation and thinking in our way of relating to the world. With regard to the first observation, a chair only affords sitting because we have the physical and biological nature that we have, but on the other hand, it also requires the *ability* to sit in a chair as well as the cultural habit of doing so for the chair to afford this for a given person: A normal Western grown-up chair does not afford sitting for an infant 6 months old, but neither does it have this affordance for a traditional Japanese who is

culturally brought up with sitting on the floor. Likewise, a vertical cliff may afford climbing for the skilled mountaineer, but definitely does not have this affordance for most of mankind. To my mind, actually, the concept of affordance is the conceptual counterpart to the concept of body schema since, on the one hand, what we do in our body-schematic way of going about the world is respond immediately, unreflectively to the affordances of the situation, and, on the other, what a given situation affords for us is relative precisely to our bodily make-up and, especially, to the use we make of this make-up in our body-schematic, skilled participation in the everyday situations we come in.

With this, I wish to end the discussion of the concepts 'body schema' and 'affordance' and turn towards the analysis of their importance in understanding the roles of the body in learning.

3. Roles of the body in learning

In the discussion of the roles of the body in learning I wish to focus on three levels at which the body is important to learning, namely the level of action, the level of the structuring of the way given situations present themselves to us, and the level of the body as 'the learner'. The levels are interlocking and interrelated, even for an analysis, and of course do not actually *exist* separately – they are different levels of one and the same activity, *i.e.* learning something in a given field. For the sake of clarity, however, I shall treat them one by one.

3.1. The level of action

In any activity we partake in our bodily being in my opinion plays a tremendous role, simply by focusing the body on the concrete activity and thereby body-schematically, that is, actively, supplying large amounts of background knowledge, without which the activity would not be possible. This is not to be understood as if the body in any way 'represented' or 'thought about' the relevant background knowledge, as if the body schema were a small homunculus that performed the same operations as the mind, only not doing it in a 'mental', but in a 'bodily', way. Rather, supplying background knowledge in the course of action is an active, not a reflective process; it is simply part of the way we in practice go about doing the particular thing in question, part of the very focusing *of* the body on the concrete activity. It is, for example, part of the way we go about studying a book that we take for granted that it will not disintegrate between our hands, that the text in it will be the same next time we open it, that the chair we are sitting in will not suddenly start flying around the room, and so on. As I stressed before, knowledge like this is learned without awareness thereof, 'as we go along', as

practical prerequisites of the activity we are undertaking, and it remains functioning in this unnoticed fashion. Body-schematically, *i.e.* through the space of possibilities opened up by our being in the world, we actively know what we mentally have never represented and in that sense cannot be said mentally to know. Using the terminology introduced above, I wish to say that knowledge like this is *incorporated* into our body schema 'as we go along' and is acted upon, not thought about.

The focusing of the body on a given action has, however, a more active role than might be supposed from what I just said, and the body-schematically incorporated background knowledge does not merely function as a prerequisite of the action. Rather, the focusing of the body makes features and aspects of the situation relevant to the specific activity undertaken stand out as important to notice and respond to – make them stand out, I should add, either to mental recognition or to pure body-schematic response, depending on the degree of absorption with which the agent is engaged in his activity. Further, *that* relevant features and aspects can so stand out is possible precisely because of our body-schematic knowledge of the affordances of concrete things as well as of less material factors of the situation: When, for example, in the context of driving, one suddenly notices a large pool of oil lying on the road, this takes place because the pool presents itself as affording a danger to the concrete activity, and it does so, precisely in virtue of our body-schematic background knowledge of the reaction of the car to driving in oil. Had there just been a big, black spot on the road, one might still have noticed it as something potentially affording danger, only, on a closer look, to realise that it actually was just a spot, but one might also very well have passed it without seeing it at all, body-schematically at once being aware that it had no relevant affordance to the concrete activity. On the other hand, had the concrete activity one was engaged in been tidying up one's home inside and outside in preparation of having visitors, a large spot on the road in front of the house would presumably have 'leaped to the eye' as affording a way of imparting a bad impression on the guests or maybe rather as affording a lot of hard work in getting rid of. In this way, our body-schematically incorporated background knowledge, in the focusing of the body on the given activity, functions as a kind of *perspective* on the situation, thereby letting what is *relevant in the concrete situation* present itself as such.

Our body-schematic way of relating to the world has yet a third dimension. Because of our bodily attunement to the affordances of the environment, we are able body-schematically to uphold an unfocused attentiveness to our surroundings, hereby making it possible for aspects important to us relative to some domain of our lives to present themselves, even though they may be irrelevant to the specific activity

undertaken at the time and as such do not stand out in the focusing of the body on this activity. The body schema precisely opens up *the space of possible actions*, thus dynamically enabling the agent's involvement in the world as a whole, and therefore the body schema is always at a marginal level attentive to other areas of this involvement apart from the specific activity currently focused on. While driving a car one may well notice a trail leading into the woods, seeing that this trail affords a leisurely walk in beautiful surroundings – though this observation is irrelevant to the driving of the car from one place to another, it may be very relevant to one's plans of going on a picnic in the weekend. Or, to use the example of the spot on the road again, depending on one's general concern with the appearance of one's home, a spot on the road in front of it may very well be noticed, even though it is of no importance to the activity of returning home by car. I would like to add, though, that the more absorbed one is in one's doings, the less one notices what is going on around oneself, *i.e.* the less unfocused attentiveness the body schema upholds. As a consequence, only factors of very big importance to one's life and general well-being will present themselves to one in such a situation. To give an example, one may be so engrossed in an activity, *e.g.* giving a lecture, that one may not notice that the floor is being flooded due to a hole in the roof even though one's shoes are getting pretty wet. But at some point, if the situation persists, one *would* notice, if not before then when one was swallowing the water since this situation affords drowning and so is highly important to one as a living being. Probably, though, one would notice it a lot earlier than this because getting cold and damp affords getting ill and so also is of importance to one's involvement in the world as a whole even though it has no relevance in giving the specific lecture[13]. The unfocused attention of the body schema is, in a word, a practical attestation to our having more concerns and interests in life than just partaking in the activity we are currently engaged in.

These reflections on the role of the body, as I noted earlier on, hold good of action in general. They, therefore, also more specifically apply when the activity concerned is or includes that of learning, be this of tacit or explicit knowledge. With regard to learning as we go along, this is readily seen from the fact that this kind of learning takes place unthinkingly when we are absorbed in action or, alternatively, when our mental, *i.e.* representational and reflective, capacity is focused on some other aspect of the situation (as in the case of learning distance-standing through participating in conversations, where the latter, not the former, has our mental attention). Thus, learning as we go along takes place *in* the focusing of the body on the concrete action

[13] One would presumably also at some point notice that something was wrong by the reactions of the audience.

as a way in practice of making this focus more adequate, of getting a better grip on or feel for the situation. It is in itself an incorporation into the body schema of background knowledge of how one goes about situations like the one in question and is as such intimately bound up with the body-schematic functions of supplying background knowledge and hereby letting aspects of the given situation stand out as relevant to notice. The function of upholding an unfocused attentiveness is, I would think, of less importance in this connection, precisely because of the role of learning as we go along in improving the body-schematic grip on the situation, that is, because of the intimate relation to the focusing function.

Intentional learning, on the other hand, is the focus of action and therefore is supported and made possible by the body schema as any other action. Quite a lot of background knowledge about people, books, furniture, stationary, the use of specific tools and equipment as well as about schools, classrooms, work places etc. is necessary for one to undertake almost any learning activity in society, and the better one gets at the thing in question, the more background knowledge specific to the given field one will have incorporated. As in any other activity, the background knowledge not only supports the learning, it also makes relevant features of the given situation stand out so that they are noticed (in this case mentally) and can be taken into account: The background knowledge of the person learning to drive a car from the start makes him concentrate on the road instead of on the buildings alongside the road, and he notices relevant features of the road like the dividing line or an area covered with slippery leaves, whereas he pays no attention to for example the colour of the asphalt. This way he is able to concentrate on learning to stay in his own lane and to take care in driving on slippery surfaces. As he gets better, he will stop noticing the dividing line except when he has to overtake another car, since body-schematically he is able to hold the car in his own lane without thinking about it, and other things, like traffic signs, will stand out for him to notice, making it possible for him to concentrate on getting to know these signs and to respond immediately to them. Concerning the unfocused attentiveness of the body schema, it will definitely also be present in intentional learning, though, as in the case of other activities, it will make no contribution to the intentional learning itself, this being the focus of action, but rather enable a simultaneous upholding of an openness to other domains of importance in the life of the learner.

With this, I wish to proceed to the level of the structuring of concrete situations by the body, emphasising once again that the levels discussed are not ontologically separable, but can only be distinguished analytically.

3.2. The level of body-schematic structure

The body, as I see it, has a variety of ways of structuring our experience of concrete situations. Here, because of limitations of space, I shall concentrate on only two of these ways, namely the spatial structuring and the affordance-related structuring. As regards the first of these, I wish to say with Merleau-Ponty that spatial concepts like 'up', 'down', 'under', 'above', 'left', 'right', 'top', 'bottom', and of course 'here', 'there', 'near', and 'far' only make sense to us because we are bodily beings, or more precisely, because we are bodily beings engaged in the world. The space of physics is relational and therefore has no absolute directions and no definite origin, though, of course, for some specific purpose *of the scientist*, one place might seem the natural starting point of a co-ordinate system, *e.g.* the starting point of a fall. Likewise, one direction may seem a preferred direction, for example that of gravity or that of a magnetic field uniform along a straight line. The naturalness of origin and preference of direction here is, however, *the preference of the scientist* decided on the basis of the physical phenomenon under study, not 'the preference of nature'. On the other hand, our own existence and bodily nature make out one definite starting point, it is "the unperceived term in the centre of the world" (Merleau-Ponty, 1962, p. 82), from which all our activities and perceptions take place and to which every point is related, *because* of our activities and perceptions, though not in any reflective way. Like our body-schematic knowledge of the spatiality of situation of the body itself (cf. above), this centre is determined through our involvement in the world rather than 'from the inside' – we know where we are through what we are doing. The world, further, is structured in 'near' and 'far', as well as in 'up', 'down', 'left', 'right', and so on, in relation to the un-thought-of 'here' of my concrete activities and concerns. The 'here' of my body is not a reflective 'here', it is a lived 'here', it is the unnoticed origin of a lived co-ordinate system as well as that which decides the scale of this co-ordinate system: 'Here' is 'where I am', and 'near' and 'far' are 'theres' in relation hereto, but the more precise meanings of these terms are not given on beforehand, but are in each case decided by what I am taking up with. Depending on the context, 'here' can be 'the chair beside the fireplace', 'downstairs', 'the town of my residence, or even 'the country I live in'. In the same way, the cookie in the bowl on the other side of the table can be '(far too) far away' if someone else is sitting closer and gets the cookie first, but an earthquake 20 kilometres from one's home can be experienced as having taken place much too close to where one is. The directions 'up', 'down', 'left', and 'right' of course do not depend in the same way on what we are doing (though the latter two do depend on which way we are facing) – 'up' is the same direction whether one is

digging the garden, reading a book, resting on the couch, or turning somersaults. These directions do, however, depend on our bodily nature and being in the world in general – it is only because of this bodily nature and the "laying down of the first co-ordinates" (Merleau-Ponty, 1962, p. 100) implied by our being in the world that our world has these fixed directions at all. Naturally, the direction of gravity has a large role to play in our (bodily) understanding of 'up' and 'down', but this is only because of our being bodily beings: Firstly, because of the fixation involved in my being in the world of one point (my existence) as the natural and given centre of the world (seen from Mars, for example, the direction we call 'up' at one point on the face of the earth is the direction called 'down' at the point diametrically opposite on the other side of the earth). And secondly, because gravity is *important* to us as bodily beings – it is part of what makes possible as well as limits the activities we can undertake. As such, it definitely is fundamental in the structuring of the world resulting from our body-schematic involvement in the world; it is so fundamental, I would wish to say, that we actually do not normally (representationally) notice its importance: The importance of gravity is *a body-schematically incorporated importance* – it is part of the way we live and act in the world that we take gravity into account. As babies, we probably learned a great deal about gravity intentionally through the all-time favourite game of infants of throwing things on the floor, but still I would suggest, in accordance with what I said above, that much of what we know about gravity we do not know representationally because we never learned it intentionally. Instead, we learned it as we went along, incorporating it body-schematically as practical prerequisites of the activities we were undertaking. Be that as it may, for older children and grown-ups involved in activity gravity definitely does not normally stand out as a feature to be noticed – rather, its importance is part of the background knowledge incorporated in the body schema, part of what we act *from*, part of what goes into making up our space of possible actions. Summing up, the spatiality of the world is structured through and through by our body-schematic being in the world, since only through this being in the world is there a definite, given origin to the world in relation to which definite directions have meaning, and in relation to which places are 'nearby' or 'far away'.

The preceding considerations about gravity bring me to the second kind of structuring of the given situation by the body schema mentioned above, namely the affordance-related structuring. As I discussed in the section on the role of the body in action, the focusing of the body on a specific activity makes certain features and aspects of the situation stand out as important. At the same time, I claimed, the body upholds an unfocused attentiveness to the affordances of the situation, thereby making it possible for us to notice aspects that, though unimportant to the specific

activity we are in the midst of, have relevance to other domains of our lives. Implicit in these two claims is, however, a third claim that I have touched upon, but not fully developed, concerning the importance of the body-schematic affordance-related structuring of the way the world presents itself to us. As I noted before, it is precisely because of our body-schematic knowledge of the affordances of things that relevant features and aspects *can* stand out at all and it is this proposition that I now wish to elaborate a bit on: The focusing of the body on the concrete activity gives *specific* structure to the situation in that it determines relevancy, but this specific structure is only possible given the *broader* structure in terms of meaning that the body-schematic knowledge of affordances provides. To put it crudely, for at chair to stand out as relevant to my tiredness, I must know that it affords sitting. Or to use one of the earlier examples: For a spot on the road to stand out as relevant to my concern of making my home presentable I must know that it affords imparting an impression of untidiness. The knowledge mentioned here is, as I have stressed before, in no way of a representational kind; instead it is a body-schematically incorporated understanding of the affordances of things. And it is precisely this understanding that gives general structure to or meaningfulness to a given situation, thereby making possible the more specific structure imposed by the body-schematic focusing of the body on the concrete activity. As in the specific case of gravity above, our body-schematic background understanding of the affordances of things (of the meaning they have for us) is an integral part of opening up our space of possible actions, this 'opening up' not understood as a theoretical or reflective process, but as a practical proceeding: The space of possible actions and the affordances of things for us constitute each other reciprocally since the affordance of something for us is relative to the use we are able to make of our bodies. Therefore, the 'opening up' of the space of possible actions, *with* the body-schematically incorporated background knowledge this 'opening up' involves, is precisely our attuning ourselves to the world and its affordances for us – an 'attuning' that comes about *in* and *through* our very living in the world. *Within* the space of possible actions, the body schema's focusing of the body on the concrete activity is a selection of one possible way of acting – which selection again is not to be understood as a process involving reflection or representation, but rather is a direct response to the affordances of the situation, on the basis of our (not necessarily representationally known, but in some cases only actively lived) concerns. Likewise, the general meaningfulness of the situation supplied by our body-schematic affordance-related structuring of the way the world presents itself to us is essential to the unfocused attentiveness upheld by the body, since it is precisely this general meaningfulness that the body is attentive *to*. Therefore, the structure our body-

schematic being in the world imposes on any given situation is fundamental to the specific activity we are undertaking, as well as to our life and well-being as a whole.

Summing up, my intentions with these two examples of body-schematic structuring, the spatial and the affordance-related, has been to show the fundamental importance of our bodily being to the way the world presents itself to us in concrete situations. As these considerations concern situations in general, they also, of course, more specifically apply to situations of learning. Every learning situation has its own spatiality of 'here', 'there', 'near' and 'far' dependent on the involved participation of the learner and has as well the more general spatiality of 'up', 'down', 'left', 'right', 'under' and 'above' dependent on his bodily being as such. The 'here' of trying to solve physics problems may be the desk I am sitting at or the classroom itself, dependent on whether I am trying by myself or together with others, the 'here' of learning tennis may be the smash of the ball against the racket or the whole court, the 'here' of a tailor apprentice may be the sewing machine or, given the analysis of Lave, more likely in general the tailor shop as such (Lave & Wenger, 1991). Likewise, every learning situation is dependent on the general meaningfulness of our body-schematic affordance-related structuring of the world – as in any other situation, only because of this structuring is the more specific structuring of the body-schematic focusing of the body on the concrete learning activity possible. No matter how new and strange a field might seem, the learner is still learning from and together with *people*, irrespectively of how strangely they act and express themselves; he is reading *books* however incomprehensible they seem; the strange occurrences take place in *buildings* with *windows* and *doors* (or outside on the *ground* with a view to *trees and bushes*); he uses *pen and pencil* to take notes of his surprise and so on. This general meaningfulness of the situation is exactly what makes possible his wonder – it is only on the background of everything he actually understands that he can focus on the surprising and non-understandable aspects of the situation and learn from them[14]. All in all, the body in my opinion plays a large role in learning at this level as well as at the level of action.

3.3. The level of the body as 'the learner'

When I talk about "the body as 'the learner'" I mean 'the body as that, which learns' or 'the body as the entity that learns'. I most emphatically do *not* mean that the body is a kind of homunculus or 'bodily mind' doing what the 'real' mind does just in a 'bodily

[14] I am here talking about intentional learning. The general meaningfulness of the situation supplied by the body-schematic structuring is as important in learning as we go along because it makes it possible to focus on the concrete action in which we are at the same time learning as we go along.

way'. What I am interested in is the *process* of learning as well as the question of to what extent it is possible to have knowledge incorporated in the body so that this knowledge shows itself actively in our doings without it (ever) being represented mentally.

It seems to me that in a straightforward, widely accepted, sense there are many examples of the body being 'the learner'. This is the case, I would say, whenever what is being learned is a bodily skill like swimming, playing tennis or driving a car. I do not mean to say that the mind is not involved at all in learning activities like these – most often, I would say, it *is*, because skills like these are, up to a certain level of competence at least, learned intentionally. The point is rather that the role of the mind is to focus the body on the activity to be learned: Since the skill is not yet mastered, the body schema is not able to do this. Instead, the whole point of the learning process, narrowly defined, in my opinion *is* the incorporation of the skill into the body schema[15] so that the skill becomes part of one's space of possible actions: One focuses on the movements of the racket to learn to get the right 'swing' to it just because one does not want later on to have to concentrate on this minor though important detail but rather wants be free to concentrate on the game itself in a more holistic way. Likewise, people learning to swim are often made to stand on land and do the strokes paying very great attention to getting these right. The reason for this is precisely that they hereby learn the movements, make them part of their space of possible actions, *i.e.* they incorporate them into their body schema. The same can be said about driving: In the intentional learning of this skill one concentrates on getting 'a feel for the car' to, through this 'feel', incorporate the car into one's body schema. And, as a consequence, once one masters driving, one is, as I noted above, able to 'sense with the car' making it possible to feel the unevenness of the road in the wheels as well as judge distances directly from the dimensions of the car. In this way, it seems to me unproblematic to claim that the body can be 'the learner'.

More interesting, perhaps, and definitely more controversial than this straightforward sense in which the body can be 'the learner' is the sense I have been talking about in this paper, namely the incorporation 'as we go along' of background knowledge into the body schema. This incorporation is, I would say, a much deeper way in which the body can be 'the learner' in that it is not restricted to the learning of relatively narrowly defined bodily skills but concerns our whole being in the world:

[15] Of course, in a wider sense the point of the learning process is the activity that the skill, once learned, will enable one to undertake – one learns tennis to be able to play tennis and one learns to drive a car to be able to drive wherever one wants to without being dependent on others to drive one or on bus and train.

Through this incorporation the ways of acting and understanding the world that we already possess are modified and widened without us being mentally aware thereof – the body simply integrates what is learned into its general attunement to the environment and its affordances, with the result that this attunement becomes more specific and adequate. This at the same time means that what is noticed about the situation becomes more sophisticated – the reciprocity of body-schematic attunement and affordances of the situation implies that more relevant and more detailed aspects of the situation are able to stand out for us as our body-schematically incorporated knowledge increases. A somewhat different way of putting this, in accordance with what I said earlier on, is that our body-schematically incorporated knowledge constitutes a *perspective* on the situation and that this perspective becomes more sophisticated as we body-schematically, as we go along, incorporate more background knowledge, hereby letting aspects of importance show up that it was not possible to notice before.

In the process of the incorporation, we are, as I noted above, not aware of the body as such, since our attention is fully directed outwards to the activity we are engaged in, and even the unfocused attentiveness that we bodily uphold is attentive to the affordances of the situation, not attentive to the body. Neither are we aware of the sophistication of the perspective that comes about *in* our learning as we go along – we simply see situations differently after incorporating knowledge into the body schema in this way. We do *not* have reflective and representative knowledge of this perspective and definitely cannot explicate it in any adequate manner. And this is so, because the perspective is not a theoretical 'point of view', but is a dynamic way *in practice* of letting the world present itself to us as a meaningful place and as demanding and facilitating given actions. The nurse, as I noted above, just *sees* that there is something wrong with a given patient without being able to point at anything specific on the basis of which she knows this. However, since we do have a 'lived familiarity' with our space of possible actions in general (cf. above) we more specifically also have a 'lived familiarity' with the perspective of our body schema. This 'lived familiarity', further, in my opinion can be said to 'resonate' in our understanding of the situation so that it 'echoes' in the words we use to describe the situation: The nurse, who is not able to point at anything specific that is wrong with a given patient may still very well be able to make another nurse 'see what she means' because their respective perspectives on the situation are relevantly similar. Because of this she can convey her meaning by the resonance of her perspective in her words – a resonance that lay people will not hear, but that the other nurse recognises immediately. And, it should be added, recognises *not* reflectively and representationally, but body-

schematically: The words will simply make her bodily incorporated background knowledge resonate.

The claim implicit in this is that the perspective of the skilled practitioner, to a great extent at least, is the perspective of his or her body-schematic involvement in the world. What I described in the beginning of this paper as the 'action-directed attentiveness' of the practitioner I now wish to claim is, or is largely, the body-schematic focusing on the concrete activity that enables the practitioner to fully engage in the situation. For the skilled practitioner the situation presents itself with affordances that are not affordances for the lay person, because only on the basis of the 'knowledge in practice' of the former can aspects of the situation present themselves in this specific way *as* affording a certain action[16]. The doctor sees the patient as affording an urgent operation; the physicist sees a given problem as affording a certain kind of solution (*e.g.* a classical mechanical or, alternatively, a quantum mechanical one); the driver sees a given traffic situation as affording for instance danger or the possibility of a quick overtake. The point is, as I stressed above, that the situation presents itself as demanding certain *actions* of the practitioner – the situation is primarily viewed in, through, and relative to activity, not at a theoretical, reflective distance. In other words, the situation presents itself to our body-schematic way of relating to the world. And this, in my opinion, is precisely because the perspective with which the practitioner views the situation is incorporated into his or her body schema: Only because of this incorporation can the situation present itself in an action-directed way, as it does.

A qualification is necessary at this point, though: In emphasising that the perspective of the skilled practitioner is incorporated into his or her body schema I might seem to be claiming that all 'knowledge in practice' is learned 'as we go along' – a claim that actually was denied earlier on. In clarification hereof I wish to say that up to a certain point of skill, the practitioner is definitely very aware of his or her perspective as well as of what the perspective lets show up and that it is only given a certain degree of sophistication of the perspective that the learning of the practitioner switches form intentional to as he goes along learning: The student of physics, for instance, tries hard to acquire the correct perspective with which to view a given problem so that this problem presents itself as an exemplification of the theories presented in the textbook rather than as describing a situation without any relevance to the words hereof. Likewise, the student nurse will be very aware that a more experienced nurse views the patients with a perspective that is different and more

[16] And, actually, as discussed above, many aspects will not present themselves at all (in *any* way) without the skill of the practitioner.

sophisticated than her own, and through her observations of the patients she will try to learn to view them in a more differentiated manner. In both of these cases, as in many others, the focusing on the perspective seems to be of at least some importance in the learning of the perspective and with it the learning of one's field. This phenomenon, however, in my opinion corresponds closely to the intentional learning of a bodily skill (more narrowly understood) described above: As one, in learning to swim for example, may have to concentrate for a while on the precise movements one is making to get these incorporated into one's body schema; in the same way, I wish to claim, it may in certain cases be necessary or at least of help to one's learning to focus *on* the perspective as well as on what one sees with its help. As in the former case, the temporary focus on the perspective is here a way of getting the perspective incorporated into one's body schema so that it may later on become part of what one acts upon rather than part of what one thinks about in acting. Like the swimmer, only given a certain level of skill is the practitioner able to engage fully in his actions, responding body-schematically to the affordances of the situation without having to represent them to himself or reflect about them.

On the other hand, once a certain level of skill has been reached, the perspective of the practitioner will only develop and become more sophisticated through learning as we go along. I already stated this in the beginning of the paper but had to postpone the defence of the statement until now. Given the preceding analysis of the body schema and the possibility of incorporating knowledge into the body schema, it seems to me, however, to be relatively clear that sophisticated 'knowledge in practice' can only be learned as we go along: Once the practitioner is skilled enough to fully engage in the situation he is in, his attention will be directed fully at what the perspective lets stand out as important in the concrete situation; he will act and perceive *on the basis* of his body-schematic involvement in the situation and therefore will not have his attention directed at *the perspective* as this is part of the body-schematically incorporated background knowledge. This is not to say that the skilled practitioner never reflects – a doctor may very well reflect upon symptoms not immediately known to him and the physicist will definitely reflect on the theories and experimental considerations that his research leads him to propose – but the point is that this reflection takes place *within* the perspective of the practitioner. The reflection does not imply a focus *on* the perspective as in the case of the student; rather, it is a reflection on the features and aspects of the situation that the perspective lets stand out as strange, noteworthy or incomprehensible. In consequence, when the perspective nevertheless is modified so that it becomes more sophisticated through the experience of the practitioner, as very often will be the case, this must happen as he goes along without

his noticing it, precisely because his attention in his skilled participation is directed 'outwards' not 'inwards'. This constitutes my reasons for claiming that sophisticated 'knowledge in practice' can only be learned as we go along.

Summing up, I wish to say that I think the body can be 'the learner' in at least two different ways: Firstly, it can be 'the learner' of a bodily skill learned intentionally, in which case the person in question focuses on incorporating a certain skill (learning certain movements) into his body schema. Secondly, the body can be 'the learner' of 'as we go along'-learning, body-schematically incorporating background knowledge about the situation the agent is engaged in. This background knowledge can be knowledge at all levels, from the most basic to the highly sophisticated and specialised 'knowledge in practice' of expert practitioners. As regards the latter, it can only to be learned as we go along, though it might at some earlier point of the practitioner's training have been necessary for him to focus on his 'knowledge in practice' to develop this intentionally to this stage. Given a certain level of skill, however, the focus of attention will be on what the 'knowledge in practice' lets show up and not on the knowledge itself. Therefore, this knowledge can only be developed and made more sophisticated through the body-schematic incorporation as we go along of more sophisticated background knowledge.

4. Concluding remarks

In this paper I have tried to show that the body has important roles to play in the learning of non-linguistic knowledge at least at three different levels. I have focused on the two concepts 'body schema' and 'affordance', arguing that in our engaged participation in practice we non-consciously, actively, dynamically live our bodies relative to the concrete actions we are undertaking, as well as to other possible actions. This dynamical relation between the body and its surroundings I have called 'the body schema', following Merleau-Ponty, and I have explicated it with the words of Gallagher, saying that it is a "practical attunement of the body to its environment". This attunement, further, is an attunement to the *affordances* of the situation, which concept is to be understood as describing an *objective* feature of the environment *relative* to our bodily being in the world: What a given thing or aspect of a situation affords for us depends on our physical make-up as well as on our skills, but given these factors the affordance of something is an objective fact. Actually, I have claimed, the concept of affordance is the conceptual counterpart to the concept of body schema: On the one hand, the body schema is precisely the enabling of an immediate and unreflective response to the affordances of the situation, and, on the other hand,

what a situation affords for us is given by our body-schematic space of possibilities for action.

Using the concepts of ‘body schema’ and ‘affordance’ I have claimed that the body contributes to learning at least at the following three levels: The level of action, the level of the structuring of the concrete situation, and the level of body as ‘the learner’. At the first level, I argued that the body schema, in focusing the body on the concrete action, makes relevant features and aspects of the given situation stand out for the agent to notice and also supplies background knowledge without which the activity would not be possible. At the same time, the body schema here upholds an unfocused attentiveness to the affordances of the situation, making it possible for aspects unimportant in the context of the concrete activity, but of importance to other domains of our lives, to present themselves. At the level of the structuring of the concrete situation I gave two examples of body-schematic structure, the spatial structuring of the world and the affordance-related structuring. As concerns the latter, this gives a general meaningfulness to the situation and thereby makes possible the specific structure in terms of relevancy that the body-schematic focusing on the concrete activity supplies. At the level of the body as ‘the learner’, I have argued, making use of a distinction I have drawn between ‘intentional learning’ and ‘learning as we go along’, that the body can be ‘the learner’ both intentionally in the learning of a bodily skill (narrowly defined) and in ‘as we go along’-learning. In the latter case the body learns by body-schematically incorporating background knowledge about the practice the agent is participating in. The claim has been, firstly, that an incorporation of background knowledge of this kind takes place at all levels of knowledge and, secondly, that much of the most basic and all of the most sophisticated knowledge we have in practice can *only* be learned in this way, as we go along.

This analysis has, I think, thrown at least some light on the question of how practitioners learn the ‘know how’, skills, ‘ways of going about their practice’ etc. that are essential to their adequate participation in their practice, but which they cannot put into words: To a great extent, they learn things like these by incorporating skills and background knowledge about the affordances of the situation into their body schemas so that they can act immediately and unreflectively with these skills and background knowledge as part of the perspective with which they view the given situation. And the incorporation will in some cases come about intentionally, as in the learning of a bodily skill, and in some cases ‘as we go along, as in the development of very sophisticated ‘knowledge in practice’.

My analysis, however, also has implications in another domain – implications that I unfortunately do not have space to elaborate on within the limits of this paper and that

I can therefore only state here as an area for further research: It seems to me that the traditional epistemological dichotomy between mind and body has to be rethought since, in the light of the preceding discussion, one must say that our bodily being is integral to learning and to what is learned: It is only because of the body-schematic focusing on the concrete activity and because of the structure our bodily being gives to the situation, spatially as well as in terms of affordance, that learning is possible at all. And what is learned is, of course, highly dependent on the structure the concrete situation has since this structure is a defining characteristic of the meaningfulness of the situation. Thus, our bodily being, or more precisely, our body-schematic way of being in the world, has decisive roles to play in a domain traditionally used in the very definition of 'the realm of the mental', *i.e.* the mind, namely the domain of knowledge. Therefore, not only must the concept of knowledge be rethought, but the distinction between the mind and the body as well[17].

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