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Intelligence without representation – Merleau-Ponty's critique of mental representation

The relevance of phenomenology to scientific explanation

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Abstract: Existential phenomenologists hold that the two most basic forms of intelligent behavior, learning, and skillful action, can be described and explained without recourse to mind or brain representations. This claim is expressed in two central notions in Merleau-Ponty's *Phenomenology of Perception*: the *intentional arc* and the tendency to achieve a *maximal grip*. The intentional arc names the tight connection between body and world, such that, as the active body acquires skills, those skills are "stored", not as representations in the mind, but as dispositions to respond to the solicitations of situations in the world. A phenomenology of skill acquisition confirms that, as one acquires expertise, the acquired know-how is experienced as finer and finer discriminations of situations paired with the appropriate response to each. Maximal grip names the body's tendency to refine its responses so as to bring the current situation closer to an optimal gestalt. Thus, successful learning and action do not require propositional mental representations. They do not require semantically interpretable brain representations either.

Simulated neural networks exhibit crucial structural features of the intentional arc, and Walter Freeman's account of the brain dynamics underlying perception and action is structurally isomorphic with Merleau-Ponty's account of the way a skilled agent is led by the situation to move towards obtaining a maximal grip.

The relation between phenomenology and neuroscience

In this paper I want to show that two important components of intelligent behavior, learning, and skillful action, can be described and explained without recourse to mind or brain representations. To do this I will explain two central concepts in Merleau-Ponty's *Phenomenology of Perception* (1962) – the intentional arc and getting a maximal grip. The *intentional arc* names the tight connection between the agent and the world, viz. that, as the agent acquires skills, those skills are "stored," not as representations in the mind, but as dispositions to respond to the solicitations of situations in the world. *Maximal grip* names the body's tendency to respond to these solicitations in such a way as to bring the current situation closer to the agent's sense of an optimal gestalt. Neither of these abilities requires mental or brain representations. Rather, simulated neural networks exhibit crucial structural features of the intentional arc. Moreover, Walter Freeman's (1991) account of the brain dynamics underlying perception and action is structurally isomorphic with Merleau-Ponty's account of the way a skilled agent moves towards obtaining a maximal grip.

Skill acquisition: The establishment of the intentional arc

According to Merleau-Ponty our skills are acquired by dealing with things and situations, and in turn they determine how things and situations show up for us as requiring our responses. To appreciate this claim we need to lay out more fully than Merleau-Ponty does how our relation to the world is transformed as we acquire a skill. Many of our skills are acquired at an early age by trial and error or by imitation, but to make the phenomenology of skillful behavior as clear as possible I will consider the case of an adult acquiring a skill by instruction.[1]

Stage 1: Novice

Normally, the instruction process begins with the instructor decomposing the task environment into context-free features which the beginner can recognize without previous experience in the task domain. The beginner is then given rules for determining actions on the basis of these features, like a computer following a program.

For purposes of illustration, let us consider two variations: a bodily or motor skill and an intellectual skill. The student automobile driver learns to recognize such interpretation-free features as speed (indicated by the speedometer) and is given rules such as: "Shift to second when the speedometer needle points to ten miles an hour."

The novice chess player learns a numerical value for each type of piece regardless of its position, and the rule: "Always exchange if the total value of pieces captured exceeds the value of pieces lost." The player also learns to seek center control when no advantageous exchanges can be found, and is given a rule defining center squares and one for calculating extent of control. Most beginners are notoriously slow players, as they attempt to remember all these rules and their priorities.

Stage 2: Advanced beginner

As the novice gains experience actually coping with real situations, he begins to note, or an instructor points out, perspicuous examples of meaningful additional aspects of the situation. After seeing a sufficient number of examples, the student learns to recognize these new aspects. Instructional maxims now can refer to these new situational *aspects*, recognized on the basis of experience, as well as to the objectively defined nonsituational *features* recognizable by the inexperienced novice.

The advanced beginner driver uses (situational) engine sounds as well as (non-situational) speed in his gear-shifting rules. He learns the maxim: Shift up when the motor sounds like it is racing and down when it sounds like its straining. Engine sounds cannot be adequately captured by words, so words cannot take the place of a few choice examples in learning these distinctions.

With experience, the chess beginner learns to recognize overextended positions and how to avoid them. Similarly, she begins to recognize such situational aspects of positions as a weakened king's side or a strong pawn structure despite the lack of precise and situation-free definition. The player can then follow maxims such as: Attack a weakened king's side.

Stage 3: Competence

With more experience, the number of potentially relevant elements that the learner is able to recognize becomes overwhelming. At this point, since a sense of what is important in any particular situation is missing, performance becomes nerve-wracking and exhausting, and the student may well wonder how anybody ever masters the skill.

To cope with this overload and to achieve competence, people learn through instruction or experience to devise a plan or choose a perspective that then determines which elements of the situation are to be treated as important and which ones can be ignored. As they restrict themselves to only a few of the vast number of possibly relevant features and aspects, decision making becomes easier.

The competent performer thus seeks new rules and reasoning procedures to decide upon a plan or perspective. But these rules are not as easily come by as the rules given beginners in texts and lectures. Indeed, there are a vast number of situations differing from each other in subtle, nuanced ways. There are, in fact, more situations than can be named or precisely defined, so no one can prepare for the learner a list of what to do in each possible situation.

Competent performers, therefore, must decide for themselves in each situation what plan to choose without being sure that it will be appropriate in that particular situation.

Now, coping becomes frightening rather than exhausting. Prior to this stage, if the learned rules didn't work out, the performer could rationalize that he hadn't been given adequate rules rather than feel remorse because of a mistake. Now the learner feels responsible for disasters. Of course, often, at this stage, things work out well, and the competent performer experiences a kind of elation unknown to the beginner. Thus, learners find themselves on an emotional roller coaster.

A competent driver leaving the freeway on an off-ramp curve, after taking into account speed, surface condition, criticality of time, etc., may decide he is going too fast. He then has to decide whether to let up on the accelerator, remove his foot altogether, or step on the brake. He is relieved if he gets through the curve without mishap and shaken if he begins to go into a skid.

The class A chess player, here classed as competent, may decide after studying a position that her opponent has weakened his king's defenses so that an attack against the king is a viable goal. If she chooses to attack, she can ignore features involving weaknesses in her own position created by the attack as well as the loss of pieces not essential to the attack. Pieces defending the enemy king become salient. Successful plans induce euphoria, while mistakes are felt in the pit of the stomach.

As the competent performer becomes more and more emotionally involved in his tasks, it becomes increasingly difficult to draw back and to adopt the *detached* rule-following stance of the beginner. While it might seem that this involvement would interfere with detached rule-testing and so would inhibit further skill development, in fact just the opposite seems to be the case. As we shall soon see, if the detached rule-following stance of the novice and advanced beginner is replaced by involvement, one is set for further advancement, while resistance to the acceptance of risk and responsibility can lead to stagnation and ultimately to boredom and regression.

Stage 4: Proficient

If, as the learner practices her skill, events are experienced with involvement, the resulting positive and negative experiences will strengthen successful responses and inhibit unsuccessful ones. The performer's theory of the skill, as represented by rules and principles, will thus gradually be replaced by situational discriminations accompanied by associated responses. Proficiency seems to develop if, and only if, experience is assimilated in this atheoretical way and intuitive behavior replaces reasoned responses.

As the brain of the performer acquires the ability to discriminate among a variety of situations, each entered into with concern and involvement, plans are intuitively evoked and certain aspects stand out as important without the learner standing back and choosing those plans or deciding to adopt that perspective. Action becomes easier and less stressful as the learner simply sees what needs to be achieved rather than deciding, by a calculative procedure, which of several possible alternatives should be selected. There is less doubt that what one is trying to accomplish is appropriate when the goal is simply obvious rather than the winner of a complex competition. In fact, at the moment of involved intuitive response, there can be no doubt, since doubt comes only with detached evaluation.

Remember that the involved, experienced performer sees goals and salient aspects, but not what to do to achieve these goals. This is inevitable since there are far fewer ways of seeing what is going on than there are ways of responding. The proficient performer simply has not yet had enough experience with the wide variety of possible responses to each of the situations he can now discriminate to respond automatically. Thus, the proficient performer, after seeing the goal and the important features of the situation, must still *decide* what to do. To decide, he falls back on detached rule-following.

The proficient driver, approaching a curve on a rainy day, may realize intuitively that he is going dangerously fast. He then decides whether to apply the brakes or merely to reduce pressure by some selected amount on the accelerator. Valuable time may be lost while making a decision, but the proficient driver is certainly more likely to negotiate the curve safely than the competent driver who spends additional time *considering* the speed, angle of bank, and felt gravitational forces, in order to decide whether the car's speed is excessive.

The proficient chess player, who is classed a master, can recognize almost immediately a large repertoire of types of positions. She then deliberates to determine which move will best achieve her goal. She may, for example, know that she should attack, but she must calculate how best to do so.

Stage 5: Expertise

The *proficient performer*, immersed in the world of his skillful activity, *sees* what needs to be done, but *decides* how to do it. The *expert* not only sees what needs to be achieved: thanks to a vast repertoire of situational discriminations he sees how to achieve his goal. Thus, the ability to make more subtle and refined discriminations is what distinguishes the expert from the proficient performer. Among many situations, all seen as similar with respect to plan or perspective, the expert has learned to distinguish those situations requiring one action from those demanding another. That is, with enough experience in a variety of situations, all seen from the same perspective but requiring different tactical decisions, the brain of the expert performer gradually decomposes this class of situations into subclasses, each of which shares the same action. This allows the immediate intuitive situational response that is characteristic of expertise.

The expert chess player, classed as an international master or grandmaster, experiences a compelling sense of the issue and the best move. Excellent chess players can play at the rate of 5 to 10 seconds a move and even faster without any serious degradation in performance. At this speed they must depend almost entirely on intuition and hardly at all on analysis and comparison of alternatives. It has been estimated that a master chess player can distinguish roughly 50,000 types of positions. For much expert performance, the number of classes of discriminable situations, built up on the basis of experience, must be comparably large.

Automobile driving probably involves the ability to discriminate a similar number of typical situations. The expert driver, generally without any awareness, not only feels when slowing down on an off-ramp is required, he or she knows how to perform the appropriate action without calculating and comparing alternatives. What must be done, simply is done.

Learning without representation: Merleau-Ponty's intentional arc

To see that this skill story suggests a non-representational account of learning, we can contrast it with a representationalist phenomenology of how our experience enriches our perception of the world. As you probably know, not all phenomenologists are anti-representationalist. Husserl held that all human perception and action was mediated by intentional content. Thus Husserl needs mental machinery to explain how past experience modifies our experience of the perceptual world. For example, he explains the fact that when I see an object from one side I see it as having a similar other side, as follows:

> The similar reminds me of the similar, and by analogy with what was given with the similar on the one side, I expect something similar on the other side. It is associated with it and "reminds" me of it. (Husserl, p. 237.)

Here Husserl is making the typical empiricist assumption that events that once played a role in our experience, are somehow "remembered" and fill out our current perceptions. But this is an unwarranted construction. Indeed, it may well be incoherent since, as Merleau-Ponty points out, there are many dimensions in which experiences can be similar, so the empiricist cannot explain why an experience calls up a specific memory as similar to it. As Merleau-Ponty puts it:

> An impression can never by itself be associated with another impression. Nor has it the power to arouse others. It does so only provided that it is already *understood* in the light of the past experience in which it co-existed with those which we are concerned to arouse. (Merleau-Ponty 1962, p, 14.)

So one would have had to already have recognized an impression as an aspect of an object in order to associate the appropriate memories of other aspects of that object with the current experience. (We will return to the problem of similarity later to see how Merleau-Ponty would deal with it).

If the skill story I just told is correct, however, the problem of association of representations of an object can be avoided. What one has learned appears in the way the world shows up; it is not represented in the mind and added on to the present experience. That is, according to Merleau-Ponty, what the learner acquires through experience is not *represented* in the mind at all but is *presented* to the learner as a more and more finely discriminated situation, which then solicits a more and more refined response. In so far as the situation does not clearly solicit a single response or the response does not produce a satisfactory result, the learner is led to further refine his discriminations. Merleau-Ponty calls this feed-back loop the intentional arc. He says:

> The life of consciousness – cognitive life, the life of desire or perceptual life – is subtended by an "intentional arc' which projects round about us our past, our future, [and] our human setting. . . . (Merleau-Ponty 1962, p. 136.)

It is crucial that the agent does not merely receive input passively and then process it. Rather, the agent is already set to respond to the solicitations of things. The agent sees things from some perspective and sees them as affording certain actions. What the affordances are depends on past experience with that sort of thing in that sort of situation.

The idea of an intentional arc is meant to capture the idea that all past experience is projected back into the world. The best representation of the world is thus the world itself.

Learning without representation: Feed forward neural networks

Merleau-Ponty holds that no mentalistic model, whether empiricist or idealist, can account for the way past experiences affects present experience, but fortunately, there are models of what might be going on in the hardware that make no use of empiricist association nor of the sort of symbols and rules presupposed in rationalist philosophy and Artificial Intelligence research. Such models are called "Feed forward simulated neural networks." According to these models, memories of specific situations are not stored and then somehow associated with current input. Rather, if given any input, the connections between "neurons" are modified by a trainer so that that input is paired with what the trainer holds to be the appropriate output. Thereafter, similar inputs will produce the same or similar output.

Feed-forward neural networks, then, provide a model of how the past can affect present perception and action without the brain needing to store specific memories at all. It is precisely the advantage of simulated neural networks that past experience, rather than being stored as a memory, modifies the connection strengths between the simulated neurons. New input can then produce output based on past experience without the net having to, or even being able to, retrieve any specific memories. The point is not that neural networks provide an explanation of association. Rather they allow us to give up seeking an associationist explanation of the way past experience affects present perception and action.

Some psychologists claim that neural-network modeling is just a new version of associationism, but this misses an important point. In sophisticated neural nets that better model the brain, inputs would, indeed, be associated with outputs, but the hidden nodes of the network would always already be in a particular state of activation when input stimuli were received, and the output that the network produced would depend on this initial state. Thus input *plus initial state* would determine output. If the input corresponds to the experience of the current situation, the activation of the hidden nodes, determined by inputs leading up to the current situation, might be said to correspond to the expectations and perspective that the expert brings to the situation, in terms of which the situation solicits a specific response. This would distance this view from passive associationism and make it a perfect candidate for the neural basis of the phenomenon Merleau-Ponty calls the intentional arc.

Still there are many important ways in which neural nets differ from embodied brains. Some of them seem to be limitations that can be overcome by further research. Thus, nets now depend for their learning on people giving them examples by pairing input and output, but work is underway on reinforcement learning techniques in which the nets can learn by feedback from the target domain.

A more fundamental difficulty, however, is endemic to learning, whether the net learns by being given appropriate situation-action pairs or by finding for itself which pairings work; to learn to recognize the sorts of situations and things we recognize and to respond appropriately, a network must respond to the same similarities human beings do. But everything is similar to everything else and different from everything else in an indefinitely large number of ways. We just do not notice it. This leads to the problem of generalization. Neural-network modelers agree that an intelligent network must be able to generalize. For example, for a given classification task, given sufficient examples of inputs associated with one particular output, it should associate further inputs of the same type with that same output. But what counts as the same type? The network's designer usually has in mind a specific definition of type required for a reasonable generalization and counts it a success if the net generalizes to other instances of this type. But when the net produces an unexpected association, can one say it has failed to generalize? One could equally well say that the net has all along been acting on a different definition of type, based on different perceived similarities, and that that difference has just been revealed.

If a neural-net does not respond to the same types of situations as similar that human beings do, it will not be able to learn our skills and so will fail to find its way about in our world. But there seems to be a puzzle here. How do human beings – let alone networks – ever learn to generalize like other human beings so they can acquire the skills required to get around in the human world? If everything is similar to everything else in an indefinitely large number of ways, what constrains the space of possible generalizations so that trial and error learning has a chance of succeeding?

To begin with, Merleau-Ponty has pointed out, and Walter Freeman's work confirms, that the similarity problem at its most basic is not a question of comparing representations. One doesn't see the current input as similar to a remembered previous input. One sees it as an input that is impoverished *in a particular way*, and in one's perception of the input one already knows what would count as a better version of it. In this way the perceiver solves the problem of the circularity of associationism by seeing the input as a deviation from the prototypical input for a given object, and so doesn't have to associate the input to the output on the basis of some arbitrarily chosen similarity. The difference is between seeing a garbled input and then guessing what previously learned input it most resembles, on the one hand, and seeing a given input directly as a deviation from a prototypical input, on the other. (This sounds like magic, but as we will soon see, it fits the phenomena of maximal grip, i.e. of directly sensing one's current experience as a deviation from a norm).

Granted that we do not compare representations, we still need to explain our sense of similarity. Merleau-Ponty would no doubt hold that the fact that we have bodies is essential to understanding how we generalize. There are three ways the human body constrains the space of possible generalizations. The first is due to the brain; the other two are due to our actual body structure.

First, the possible responses to a given input must be constrained by brain architecture. This innate structure accounts for phenomena such as the perceptual constants the gestaltists investigated. These are given from the start by the perceptual system as if they had always already been learned. Merleau-Ponty calls them "déjà monté."

But this alone would not be enough to constrain the generalization-space so that all human beings learned to respond to the same set of inputs as similar. It turns out, however, that the order and frequency of the inputs further constrains how a net will generalize. This order is determined by the trainer in what is called supervised learning, but if the net is to learn by itself, that is, if its connection strengths are to be allowed to adjust themselves on the basis of the input-output pairs it encounters, then the order and frequency of inputs will depend on the interaction of the structure of the embodied network and the structure of the world. For example, things nearby that afford reaching will be noticed early and often. Their various ways of being reachable and the kind of grip they provide will be an obvious source of shared similarities. Thus, body-dependent order of presentation provides the second constraint on generalization.

The third constraint depends on what counts as success. In reinforcement learning, what counts as success in each specific domain is defined by the researcher. For an agent in the world, however, success depends on some measurement of satisfaction. Thus, those input/output pairs will count as similar that move the agent towards satisfaction. We will have to turn to what counts as satisfaction in a moment.

First, to sum up, these three structural body functions – brain structure, salience and order of experiences, and similarity of satisfactions – may be all that is needed to explain why all human beings generalize in roughly the same way and so acquire the skills necessary for getting around in the human world whose affordances their self-moving bodies both constitute and reproduce.[2]

All this puts disembodied neural-networks at a serious disadvantage when it comes to learning to cope in the human world. Nothing is more alien to our life-form than a network with no up/down, front/back orientation, no interior/

exterior distinction, no preferred way of moving, such as moving forward more easily than backwards,[3] and no emotional response to its failures and successes. The odds are overwhelming against such a net being able to see the similarities we do and so to learn to classify situations and affordances as we do, to distinguish what for us is relevant and irrelevant, to pick up on what is obvious to us, and so forth. In our world the cards are stacked to enable entities that share our embodied form of life to learn to cope in a way we find intelligent, while leaving disembodied creatures looking to us hopelessly stupid.

Action without representing a goal: Merleau-Ponty's maximal grip

But this discussion of how nets learn poses a problem for those who want to do without representations. I said a moment ago that the performer acquiring a skill modifies his response when the action does not produce a *satisfactory* result, but then it looks as if, in order to learn from one's success and failures, one would need a representation of one's goal beforehand so as to measure one's success or failure relative to that goal. As usual it turns out that my colleague, John Searle, holds just the representationalist view of action that Husserl would have held if he had worked out a theory of action, and so just the view Merleau-Ponty opposes. So, to explain Merleau-Ponty, we can this time contrast his view with Searle's.

Searle (1991) formulates both a *logical* and a *phenomenological* requirement for a movement's being an action, although he lumps them together. The logical condition is simply that an action have conditions of satisfaction. The phenomenological condition requires that these conditions of satisfaction must be a goal *in the actor's mind*, or if unconscious, they must at least be the sort of goal one *could* consciously entertain.

If put in a sufficiently minimal way, the logical condition is not in dispute between Searle and Merleau-Ponty. But Merleau-Ponty *does* dispute the Husserlian phenomenological requirement. The question is whether the intentional content (i.e., conditions of satisfaction) that governs an action must be represented in the mind.

Merleau-Ponty points out that an action can conform to conditions of satisfaction without the agent having these conditions in mind as a goal.

> The polarization of life towards a goal is entirely unrepresented. Objective thought bypasses true intentionality, which is *at* its object rather than positing it. (Merleau-Ponty 1962, p. 446.)

Merleau-Ponty goes on to claim that this non-representational form of activity is a more basic kind of intentionality, missed by the reconstructions of what he calls “objective thought”. He means by objective thought one’s standing over against an independent object and then finding out about it. According to Merleau-Ponty, in everyday coping activities the agent is in a much tighter relation to the object of his concern than standing back and positing it. We have seen part of what Merleau-Ponty has in mind here when we considered his notion of an intentional arc, but now we need to consider an even tighter relation between an active agent and the object he is dealing with.

According to Merleau-Ponty, higher animals and human beings are always tending towards getting a *maximal grip* on their situation. Merleau-Ponty’s notion of maximal grip comes from perception and manipulation. When we are looking at something, we tend, without thinking about it, to find the best distance for taking in both the thing as a whole and its different parts. When grasping something, we tend to grab it in such a way as to get the best grip on it.

> For each object, as for each picture in an art gallery, there is an optimum distance from which it requires to be seen, a direction viewed from which it vouchsafes most of itself: at a shorter or greater distance we have merely a perception blurred through excess or deficiency. We therefore tend towards the maximum of visibility, and seek a better focus as with a microscope. (Merleau-Ponty 1962, p. 302.)

> My body is geared into the world when my perception presents me with a spectacle as varied and as clearly articulated as possible, and when my motor intentions, as they unfold, receive the responses they expect from the world. (Merleau-Ponty 1962, p. 250.)

According to Merleau-Ponty, in absorbed, skillful coping, I don’t need a mental representation of my goal. Rather, acting is experienced as a steady flow of skillful activity in response to one’s sense of the situation. Part of that experience is a sense that when one’s situation deviates from some optimal body-environment relationship, one’s activity takes one closer to that optimum and thereby relieves the “tension” of the deviation. One does not need to know, nor can one normally express, what that optimum is. One’s body is simply solicited by the situation to get into equilibrium with it. As Merleau-Ponty puts it:

> Whether a system of motor or perceptual powers, our body is not an object for an “I think”, it is a grouping of lived-through meanings which moves towards its equilibrium. (Merleau-Ponty 1962, p. 153.)

To get the phenomenon in focus, consider a tennis swing. If one is a beginner or is off one’s form one might find oneself making an effort to keep one’s eye on the ball, keep the racket perpendicular to the court, hit the ball squarely, etc. But if one is expert at the game, things are going well, and one is absorbed in the game, what one experiences is more like one's arm going up and its being drawn to the appropriate position, the racket forming the optimal angle with the court—an angle one need not even be aware of—all this so as to complete the gestalt made up of the court, one's running opponent, and the oncoming ball. One feels that one's comportment was caused by the perceived conditions in such a way as to reduce a sense of deviation from some satisfactory gestalt. But that final gestalt need not be represented in one's mind. Indeed, it is not something one *could* represent. One only senses when one is getting closer or further away from the optimum.

To help convince us that no representation of the final gestalt is needed in order for the skilled performer to achieve it, Merleau-Ponty uses the analogy of a soap bubble. The bubble starts as a deformed film. The bits of soap respond to local forces according to laws which happen to work so as to dispose the entire system to end up as a sphere, but the spherical result does not play a causal role in producing the bubble. The same holds for the final gestalt of body and racket in my example. Indeed, I cannot represent how I should turn my racket since I do not know what I do when I return the ball. I may once have been told to hold my racket perpendicular to the court, and I may have succeeded in doing so, but now experience has sculpted my swing to the situation in a far more subtle and appropriate way than I could have achieved as a beginner following this rule.

According to Merleau-Ponty, we not only move to complete a good gestalt in any skill domain, we also tend to improve what counts as a good gestalt in that domain. As we have seen, the involved performer tends to discriminate more and more refined situations and pair them with more and more appropriate actions. Thus, the intentional arc is steadily enriched and refined. But again this is not a goal-directed activity. One is no doubt consciously motivated to acquire a skill like tennis, but one does not try consciously to discriminate more and more subtle tennis situations and pair them with more and more subtle responses. One wouldn't know how to try to do such a thing. All one can say is that in order to improve one's skill one must be involved, and get a lot of practice. The body takes over and does the rest outside the range of conscious representation. This capacity is for Merleau-Ponty a further manifestation of the body's tendency to acquire a maximal grip on the world. Only because there is a tendency towards maximal grip in this fundamental sense is there an intentional arc.

And as we have seen, such skillful coping does not require a mental representation of its goal. It can be *purposive* without the agent entertaining a *purpose*. As Merleau-Ponty puts it:

> [T]o move one's body is to aim at things through it; it is to allow oneself to respond to their call, which is made upon it independently of any representation. (Merleau-Ponty 1962, p. 139.)

Searle, however, claims that a sense of my causing my bodily movement in order to achieve the conditions of satisfaction that I am seeking to achieve – what he calls an intention-in-action – is the *only* way I could experience the difference between my moving my body and my body being made to move, by, for example, an electrode in my brain.

> The only cause in question could be the fact that I am actually *doing it* intentionally as opposed to passively experiencing it. And that difference derives from the fact that in the case of doing it intentionally there is an intention-in-action. (Searle 1991, p. 294.)

Moreover, in the case of an action, Searle says, my intentional content must have a mind-to-world direction of causation. That is, my intention-in-action must be experienced as causing a bodily movement that causes a change in the world.

But given Merleau-Ponty's phenomenology of skillful coping, we can see that there could be at least two kinds of passive experience, one of which could, in spite of its passivity, be attributed to me as an agent. True, in the electrode case, I am compelled to move, and so am not an agent at all. In the tennis example, however, I am letting myself be moved by the gestalt tensions I experience on the court. Such movement, while passive, is not a mere compulsion. We can thus agree with Searle that the *logic of action* requires it have a *world-to-mind direction of fit* – our actions must have as conditions of satisfaction bringing the world into line with what we would want if we thought about it – but we can hold, contrary to Searle's account, that *the experience of acting* need not have a *mind-to-world direction of causation*. Unlike deliberate action, skillful coping turns out to have a world-to-mind direction of causation. We do not experience our intentions as causing our bodily movements; rather, in skillful coping we experience the situation as drawing the movements out of us.

In sum, when I am acting in flow, my movements are experienced as actions if:

1. I am in *control* of my movements in the sense that I can stop doing what I'm doing if I will to do so, and
2. My movements are *caused* by the gestalt formed by me and my situation. As we have seen, that means the situation is experienced as drawing the appropriate action out of me.

When ongoing coping is interrupted, or when skilled behavior is not possible, such as when I am learning a new skill, the above conditions are transformed into the ones one finds in the everyday concept of action Searle successfully analyzes. (1) I will the bodily movements that brings about the conditions of satisfaction I am trying to achieve. (2) I am in control of my movements, in that they are experienced as happening because of my volition. These logical conditions for a movement to be an action are based on reflection on the objective experience of deliberate action. They clearly contradict the phenomenological conditions for what counts as an activity of involved coping. Analysis and phenomenology are each right in their own domain, but these two sets of conditions for a movement's being an action cannot be reconciled. Objective analysis has phenomenological support but the phenomenology only fits a disturbed or privative form of activity. I only deliberate when coping is blocked, and I can only deliberate on the background of continued coping.

But the involved coping that achieves a goal without a prior representation of it still seems like magic. (Merleau-Ponty sometimes uses that very metaphor.) To see how strange his claim is, consider the game of "hot" and "cold." In that game one player guides the other's search by saying "hot" or "cold," the searcher just follows the clues without needing to know where they are leading. But, in the game, the player giving the clues needs to know where the goal is. Otherwise, how could he tell whether the searcher was near or far from it. Can one imagine a brain mechanism that explains how, although no one knows the goal state, the performer is, nonetheless, successfully led to it? How could the structure of brain activity underlie the structure of such a phenomenon?

Walter Freeman's attractor theory

Walter Freeman's theory of how the brain produces skilled behavior explains precisely how goal-directed behavior could be controlled by a brain state that, only in the weakest sense, could be called a representation of the satisfactory gestalt that behavior is drawn towards.

Walter Freeman (1991) has a worked out theory of how behavior could be controlled by a brain state that is in no way a propositional representation of the satisfactory gestalt an action is drawn towards. According to Freeman, the simulated neural network and the brain operate according to the Hebbian theory of learning, that is, the strength of the connections between the neurons changes on the basis of experience. This kind of adjustment of connections is all there is to learning in a simulated neural network. Freeman's important contribution is to show that the Hebbian changes in connection strength can be the basis for a higher-level process. Learning consists in adjusting the connection strengths so that bursts of activity can fall into a number of different chaotic attractors. The role of the impoverished input from the sense organs, then, is simply to constrain the burst so that it falls into a specific basin of attraction which, on the basis of learning, has been associated with the object that caused that particular input. In this way, the brain responds *not* to the impoverished input, but to the object which produces this impoverished input and others like it. (Remember, Merleau-Ponty said the learner was directly at the object).

Now to the phenomenon of maximal grip. According to Freeman, when a mammal such as a rabbit experiences successes and failures in a type of situation, its brain forms neuron connections which, when the rabbit is again in that type of situation, lead to a burst of global neuronal activity that is a certain point on a specific energy landscape. A point on that landscape is the amount of energy it takes the whole configuration to be in that state, and the points around that point on that landscape are nearby configurations that require more or less energy. The brain can thus be understood as a dynamical system with energy peaks and valleys. Each peak or valley corresponds to a local maximal or minimum. On an analogy with gravity, it takes a lot of energy to climb to the top of a peak and it is easy to move towards the bottom of a valley. Like someone walking around in the landscape, the current energy state of a burst of neural activity can move in a direction that requires more energy or it can relax into a state that requires a minimum of energy. Since, like a ball rolling down a hill, when the system gets within range of such a minimum, it tends to move closer to this minimum energy state, the states close to a state of minimum energy form what is called a "basin of attraction."

Past experience has set up the neuron connections so that the current perceptual input, which is similar to some past input but never exactly like it, puts the brain area that controls movement into a specific energy landscape. Once that brain area is in that landscape, movements are caused that tend to move the brain state closer to the bottom of the nearest basin of attraction. The rabbit, or in my example the tennis player, presumably senses this tendency of the system to seek a minimum energy state as a tension drawing it towards an optimal gestalt or maximal grip.

At any given moment, the system, like the player in the "hot" and "cold" game, is in a state that is near or far from the bottom of some specific basin. But, if that were all the information the brain provided, the person would be like a player who could only guess where to look next, and so at best find what he was seeking by trial and error. This is not our experience of skillful coping. Fortunately, the energy landscape gives more information than just "hot" or "cold." It tells the player, as it were, what would make him hotter without telling him where the hottest point is. The system thus directs the player to make those movements that result in the brain approaching the lowest accessible point in its current energy landscape, without the player needing to represent where that lowest point is or how to get there, any more than a river needs to represent as its goal the lowest point in the landscape in order to find the optimal path down a hill.

Obviously, the sort of knowledge such a system embodies could not be something one was conscious of and so could not be understood as a conscious or unconscious representation. The attractor could be called a representation only in the very weak sense that it does incorporate past experience and leads to action on the bases of that past experience. Thus, thanks to Freeman's work, Merleau-Ponty's claim that the representationalist philosophy of mind is mistaken, can be defended not only on the phenomenological level but on the neurological level as well.

Notes

1. For a detailed treatment of the phenomenology of skill acquisition, see Dreyfus, H. and S. Dreyfus, S. (1982).
2. For a phenomenological version of this argument see Dreyfus, H. (1991, Ch. 7).
3. For a worked out account of human body-structure and how it is correlative with the structure of the human world, see Todes, S. (2001).

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