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**AGENCY AND SELF-AWARENESS: ISSUES IN PHILOSOPHY AND
PSYCHOLOGY**

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Perceiving intentions

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Among the many issues raised as part of the "other minds" problem, is the discovery of the ways which justify inferring from public behaviour the existence of mental predicates in others. How does one "go beyond" physical moves, dynamical patterns of spatial displacement of bodily segments, to interpret these as buying a ticket, throwing a ball to a dog, expressing joy? A traditional theory suggests that understanding others presupposes understanding oneself. If a subject enjoys access to her own inner states while she acts, she may be able to use analogical reasoning to attribute to others intentions, beliefs and desires corresponding to her own (Armstrong, 1968).

This way of framing and answering the problem draws on the intuition that self-knowledge is the secure ground on which knowledge of others might be gained. This classical way of putting the problem may raise various objections. One may question the Cartesian assumption according to which we learn about ourselves through introspection, rather than by collecting information about the physical and the social world. One may be worried by the verificationist flavor of the choice of feelings and sensations as the basis for our knowledge of others. It is furthermore controversial that analogy might help bridging the gap between self and other minds. As Ryle (1949) insisted, even granting privileged access to one's own intentions, analogy does not solve the problem, for others differ from me, both in their "observed

appearances" and in their actions (p. 53). Analogical reasoning does not seem to offer a promising route to understanding others because at best it would only allow understanding actions and mental events already experienced by the attributor. More radically, Wittgenstein showed that analogy falls short of attributing the relevant mental state to *another mind*: understanding someone else's pain may simply consist in grasping how that might hurt *oneself* (in another body). The analogy fails to bring in the notion of a different person having her own internal states. How can a wincing behaviour be associated by an observer with pain felt by *someone else*? How might an egocentric relation to her own action space help an agent reconstruct alien movements as belonging to *another agent's* action space?

The traditional view on the problem of other minds would be clarified, if not solved yet, if it could be shown that the apparent gap between introspective and social knowledge results from two mistakes : ignoring what can be directly perceived about others; and failing to acknowledge that information about oneself can be gained by looking at the external world. In this chapter, we will concentrate on the reasons we may have to say that there is a common source of knowledge for self and others' intentional behaviour. Our approach will however not directly bear on mental understanding, but rather on one of its preconditions: intentions, at least those of the most ordinary, physical kind, that give rise to bodily movements and to changes in the external world.

Understanding intentions and actions : A perceptual theory

How does an agent gain knowledge about her own acts? How can she identify *her own* current intentions, and how does this capacity relate to identifying intentions as driving *others'* observed behaviour? It does not seem *prima facie* plausible to claim that both kinds of attribution of an intention are effected in an even remotely similar way. A received view maintains that intentions are identified in self through non-observational knowledge, while another person's intentions are recognized through perception-cum-inference (Anscombe, 1957). Intention does not seem to be the only kind of mental event or disposition to be attributed differently according to its particular target - self or other - : pains, beliefs, desires, emotions, also seem to allow a similar contrast between first and third person attributions.

A common argument for invoking a non-observational source of knowledge is that there is no apparent mediation, in this kind of case, between evidence gathered and a fact to be known : one directly grasps one's own physical posture or intention to do P, without apparently having to identify typical sensations for being in that posture or having that intention. The notion of "knowledge without observation", however, raises the problem of understanding how new knowledge can be gained when no sensory information is collected. How is an agent in a position to recognize, for example, that her leg is bent, or that she intends to drink a glass of water? The immediate or direct character of the kind of knowledge one has of one's own limb position, of one's own pain or intention, is compatible with the fact that some type of informational access is provided to the relevant property. A plausible alternative to the non-observational knowledge approach consists in suggesting that a subject becomes aware of her being in such and such a state through perception. After all, many clear-cut cases of perceptual states also have such a direct relation to their own contents. When for example an observer sees a patch of red, she does not first identify the sensation she has, then correlate it with some external property, to *infer* that there is some red object out there. The external fact is what she directly sees.

A second ground for rejecting the non-observational view is linked to the demands it places on the relation between being in a mental state and attributing that state to oneself. According to this view, one cannot be in pain, have an emotion, form an intention, without simultaneously forming the belief that one has it.¹ One might object that pains, emotions, physical postures, intentions, often fail to be acknowledged by their bearer; they may be currently active in an individual (that is, be contextually triggered and control her behaviour in a way essentially similar to conscious pains, emotions, physical postures and intentions), while being, at least for some time, undetected. These two arguments seem to make it worthwhile to try articulating in more detail a theory of the kind of access that an organism has of her own proprioceptive and intentional states, thus grounding knowledge of one's current deeds, intentions and well-being in specific informational facts, which would in turn be stored in memory.

¹ see Shoemaker, (1996).

Sensory perception, generally speaking, consists in collecting information about an objective, independently existing world. Let us briefly summarize the ingredients which have to be present for some event or property to be perceived.

a) A perceiving subject, using specialized captors, extracts spatial or qualitative bits of information on a property, event or state of affairs, such as:

(1) "O is presently at P"

(2) O has Q, R, S (color, shape, sound, texture (..) properties)

b) Such perceptual knowledge is represented in a *phenomenological* way ; in other words, a distinct qualitative feeling is normally associated with the perceived properties. Seeing involves in standard cases having a visual experience in which a state of affairs is being *presented* to the seer².

c) On the basis of the information extracted by the senses, perceptual judgements produce a conceptual categorization of the perceived events or objects, through which a singular percept is subsumed under some concept : "this is a horse", "this is a ringing of the bell », and so on.

d) Perceptual judgements may be *either veridical or illusory* : to be veridical, a perception must present the world as seeming to be what it actually is, and the fact that the world has the presented property must be what causes the perceiver to have this perception. In such a causal theory of perception, which we will have to take here for granted, the existence of a causal link between the world and a subject's perceptions makes her awareness objective.

When the relevant perceptual mechanisms are not reliable, or when the situation perceived is ambiguous or specifically contrived so as to produce systematic deviant subjective effects, the observer may produce wrong judgments induced at a perceptual, rather than at a conceptual level.

e) A basic claim of perceptual realism, on which non-idealist philosophers agree, is that the objects of perception are independent from the fact that they are being perceived. That there is a tree in my visual field is true by way of there being a tree at a certain time and location, *and* my being in a position to see it, *and* the latter capacity being in part caused by the fact that there is a tree there. In no way is the existence of the tree at this location contingent on my own capacity to perceive it. In

² Such a presentation conveys perceptual content in an analogical, nonconceptual mode; on this notion of a non-conceptual content of perception, see Evans, (1982), Peacocke (1992a), (1992b), Crane, (1992), Bermudez, (1995), (1998). Among opponents, Armstrong (1968), McDowell, (1994).

other words, the existence of perceived events necessarily lies, in a *de re* mode, *outside* the scope of perceptual attributions. Any perceptual event thus essentially involves a counterfactual truth, to the effect that

"For some particular object O existing at time T and location L, had a non-instrumented perceiver P not been appropriately located at T in the relevant vicinity of L, P would not have perceived O".

Given this type of analysis, proprioceptive states seem to fall naturally within the scope of perception.³ The existence and mechanisms of a specialized sense, sometimes called "muscular sense", allowing a subject to identify the types of postures which he currently has, have been documented by pathological cases such as de-afferented patients, as well as by experimental work on muscle vibration. Specialized sources of evidence are used to appreciate one's own kinesthetic posture. Muscular proprioceptive messages from various body segments (most notably, from eye, neck and foot muscles) help a subject keep track of her own posture and gaze direction⁴. Although terms like "observation" and "perception" as employed in ordinary psychological idiom may sound inadequate to express this kind of informational extraction and use in postural judgment, this case is vision-like in all the main respects. Proprioception like vision, allows facts and objects of the spatial and qualitative varieties to be grasped (the subject's head being twisted to the left ; her legs being bent, etc.) ; it is phenomenological, in the sense that there is something it is like to experience that one's leg is bent, or that one's head is twisted to the left.

Moreover, a subject who feels her legs bent picks up sensory kinds of information to form a judgment *about an independent physical fact*. The latter is independent in the sense that the position of a limb is not constituted by the awareness of the subject whose body is involved. One may fail to know one's limb position for various reasons, including deafferentation, experimental manipulation of one's tendons and muscles, and so on. It may on the other hand seem to one that one's limb is in a position different than it actually is. Illusory proprioceptive states can also be produced experimentally by tendon vibration. A motionless subject may in those modified

³ For a full defense of this view, see Martin (1995).

⁴ See Roll, Roll & Velay (1991).

conditions, for example feel her head, trunk, or whole body rotate.⁵ The *cause* of perceiving that one's legs are bent is that some specific muscles, tendons, and joints are in the particular condition which causes the brain to be in certain corresponding states underlying the perceiver's distinctive experience. Proprioceptive states thus have a perceptual structure very similar to the visual system's.

When it comes to intentional action, a perceptual theory seems at first blush natural and adequate only in the case of a detached observation of another's behaviour. It is a fact of experience that when a perceiver observes someone else's bodily movements, she *directly* perceives these movements as goal-directed and intentional. Moreover, what is consciously perceived and stored in memory is not the pure sensorimotor aspect of the movement, but rather part of its teleological content, that is a specific dynamic interaction between behaviour and environment, as involving *this* or *that* part of the body, with *this* kind of timing and *that* portion of space being a target of the action. **These various demonstratives refer to perceptual dynamical sequences which can be experienced without a conceptual capacity coming into play.** Now it is plausible to refer to what is immediately perceived, in this kind of case, as the agent's intentional action, rather than as her bodily motion.

Several arguments substantiate the claim that specialized perceptual mechanisms deal with the dynamical pattern of an observed movement. Humans can easily discriminate a biological motion from a non-biological, mechanical movement, even when the cues are limited to a few luminous dots located on the moving joints, with no background information available (Johansson, 1977). Such an ability has also been shown present in 3-month old babies (Bertenthal, 1993). New borns have furthermore been shown to imitate facial movements presented in their visual field, such as tongue protruding, which suggests that they perceive the stimulus in the format of a possible action (Meltzoff & Moore, 1999). Among the perceptual features that an infant might be innately disposed to use as markers for intentional behaviour, searchers have identified the properties of being a self-propelled movement, (Premack, 1990), of having an irregular path (Mandler, 1992), and of exerting non rigid transformations on objects (Gibson et al., 1978). Facial and vocal expressions have also been cited as determining the value of the goal for the agent (Haviland & Lelwica, 1987).

⁵ Cf. Roll, Gilhodes, Roll & Velay, in Jeannerod ed. (1990), 549-565.

It will be objected here that this perceptual capacity to discriminate animate movements does not amount to perceiving an action with a definite intentional content. The recognition of an early perceptual capacity for *discriminating intentional agency* in others should not lead one to jump to the conclusion that an infant *attributes intentions to others*, for the latter capacity involves a perceptual *judgment* using intentional concepts as well as the recognition of others as independent selves. Just as an infant can manipulate a toy and extract the shape and texture information concerning that object without forming the judgment [that a toy is in her hands], she may look at the intentional action A of an agent S without recognizing [*that S does A*]. Perceiving a biological movement as an action, the objection goes, would require applying the whole explanatory structure of human agency in terms of intentions and reasons to act.

This argument thus rejects the transition from "purely seeing" a movement that is in fact an action to "seeing a movement *as* an action", that is, it rejects the transition from discriminating an intentional action to perceiving it *as such*, on the basis of the additional cognitive resources that are needed for such a transition. A second argument would further object that such a transition is often unwarranted. A well-coordinated and clearly target-oriented movement may fail to be an action, for example when the agent did not form any intention to act, as in post-hypnotic compulsive behaviour, in imitation behaviour, where a subject is involuntarily mirroring the actions she observes, or in utilization behaviour, where she responds automatically to a functional stimulus.⁶ So even leaving aside the fact that many actions do not involve a physical movement - but rather a refusal to move or speak -, we must recognize that an animate movement is a rather poor perceptual guide for action. There is more to action than biological, target-oriented movement.

A first way of answering these objections consists in claiming that without such an innate sensitivity to this kind of movement in perception, a subject would be unable to apply the concept of an action to specific kinds of dynamical patterns. What is gained through perception is thus a sensory basis for later judgments, when the concept of an action is acquired (independently from perception : through language, learning, etc.). Now the question *when* a concept of intention is grasped depends in part on a theoretical decision about what mastering a concept amounts to. Several kinds of abilities have been suggested, such as an implicit ability to attribute goals in

preverbal communication (around 9 months),⁷ interpreting the goal-directed spatial behaviour as a marker of rational agency (around 12 months),⁸ attributing intentions to dolls during play (around 20 months),⁹ or attributing verbally motives to agents (around 21 months).¹⁰

This view thus grants that perceiving an action at a sensory level does not amount to perceiving an action as such, but emphasizes that perceiving actions play a major role in the capacity to apply the concept of an action when it is acquired. Even if the "animate agency" feature may be unreliable in some circumstances, it certainly is a precondition for reacting differently to physical objects subject to natural regularities and objects governed by motives.

Let us note here a difficulty of this position when it is associated with the view that intentions are conceptually grasped only when a theory of mind is developed (at around 3 to 4 years). Surely, non-human animals are able directly to see an attack, or a court display, as an unmistakable dynamic pattern of behaviour associated with some specific target event. This type of perceptual format is exemplified in ritualized behaviour, whose goal is to influence the motivational states of the conspecifics in some predetermined way. The detailed teleological structure of ritualized behaviour would not be intelligible if there was no perceptual system able to extract the relevant intentional pattern expressed in an animal's behaviour. (Lorenz, 1983, Zahavi, 1997). Here again, the claim should not be understood as involving *a mental attribution* of intentions. An animal which extracts the information about its predator's intention does not need to have the corresponding *mental concept* of intention, anymore than an animal able to use conspecifics' signals needs to have the full mental concept of communication. What is claimed is only that living creatures had better be in a position to extract perceptual information about typical kinds of events involving conspecifics' or predators' agency. Even though they lack the *mental* concept of intentionality, they must be ready to acquire the perceptual knowledge that a specific kind of action has been launched against them, or is to involve them otherwise crucially. Thus they should be able to perceive the action in some dynamic,

⁶ On these syndromes, see Lhermitte, (1983), Lhermitte et al., (1986).

⁷ Harding & Golinkoff (1979).

⁸ Gergely et al., (1995).

⁹ Fenson (1984).

¹⁰ Bretherton, McNew & Beegly-Smith, (1981).

action-specific format, and to categorize it according to its consequences.¹¹ In this strategy, it is thus accepted that perception of animate movement constitutes, in the human case, a preliminary step to an understanding of action in fully intentional/mental terms, and, in the animal case, a specific domain of registration that may offer, in time, resources for teleological categorization.

A second strategy however defends the view that the transition from perceiving an animate movement to perceptual judgment (where an action is seen "as an action") does not require a contribution from some external faculty (such as language, learning, etc.). In this view, infants and non-human animals have the capacity to judge in some implicit way that an action of some crude type is performed. This strategy has been adopted by those who defend a modularist conception of theory of mind development, such as Leslie (1994) and Baron-Cohen (1995) : detecting intentions is taken to be a specialized informational mechanism that responds automatically to perceptual inputs with predetermined features. There is no need in this view to distinguish "perceiving an action" and "perceiving it " as an action", for the very format in which the action is perceived implies that it is dealt with as an action, which the subject must adequately identify and respond to. The two objections presented above are deflected by admitting that the proto-concept of action that is automatically triggered by perceptions of animate movements needs to be enriched and corrected in order to be part of a wider and more reliable inferential capacity. This proto-concept is generally restricted to categorizing a dynamic pattern as leading to a particular goal. Modularists standardly hypothesize that additional modules, such as SAM and above all ToM, offer the kind of resources allowing a child to explain (in mental terms) why an agent performs an action with such and such an intentional content.

We do not need at this point to arbitrate between these two strategies to deflect the objections above. What is clear is that, in both cases, "intentions" are taken to be grasped in a different way, from an early phase in which intentional actions are discriminated (in a sensory way, in the first view, or categorized through protoconcepts, in the second) to a later phase during which their representations are embedded within a general theory of rational agency.

¹¹ We will presuppose here that non-human animals can use concepts to predict regularities in their environments. See Proust (2000b)

These considerations should warrant a specific terminological use that will be adopted in the remainder of this chapter. What we tried to establish above is that the word "intention", which refers usually to a representation conveying the *mental conceptual content* of an action and driving its execution, needs to be extended to what is given in perception when another agent acts intentionally. By claiming that an intention, rather than the corresponding action, is perceived, we want to emphasize that perception offers all the evidence needed, in many ordinary cases, for judging -- without inference -- not only what an agent does, but what she is up to. In fact, the very anticipatory and teleological nature of this kind of perception makes it plausible to say that what is seen is an intention, and not only a developing action. This kind of use is not isolated: although emotions in other agents are also mental states with an intentional content, they are taken to be perceived early on, even when the corresponding concept is lacking. We now want to suggest that it also makes sense to say that an agent perceives her own intentions in a similar way as she does others'.

Perceiving one's intentions

Let us first remark that, in order to draw this parallel, we need to exclude a large family of cases of accessing one's own intentions that are irrelevant for it. A basic distinction made by Searle (1983) will help us make this point. There are two classes of intentions, named "prior intentions" and "intentions in action". Prior intentions are formed prior to the corresponding actions; intentions-in-action are formed while the action occurs. There is a fundamental difference in the kind of knowledge one can have of having one or the other type of intention. For example, an agent may form the project to visit her uncle, and store this prior intention in memory while her action develops. When an agent forms a prior intention to perform action A, she uses her concepts and inferential capacities to represent her goal as well as a relevant instrumental action. The question of how the agent knows about her own intentions, in that case, can be solved by way of the *belief* the agent entertains that she formed such and such an intention with such a content. The agent may thus know that such and such an intention will control her behaviour because she remembers having explicitly formed this prior intention, and expects to find herself in the relevant context for acting.

This kind of case diverges from the case of third person intention-reading to the extent that there seems to be, in the prior intention case, no public or perceivable counterpart of the first-person, private event of intending. If we want to draw a fair comparison between first and third person perception of intentional action, we must therefore restrict our analysis to a situation in which no belief about a prior intention is available to the agent while she acts or at least in which such a belief is not sufficient for the agent to keep dynamically track of her own doings.

Before we consider these restricted cases, let us first stress the importance of perceiving one's own intentions (that will be called "perception-in-action") in the ordinary case. An agent who has stored conceptual knowledge about her own goal in her working memory (and therefore believes she intends to A) has to check what her progress towards her goal is. She must in particular appreciate whether her occurrent movement token converges to, or departs from, her pre-established target. Not only a concept, but a perception of the action (or element of the action) currently performed, is necessary to make the necessary adjustments and corrections. Therefore even in the case where an agent formed a conscious prior intention, and carries it out at some later point in time, the agent must still have a perceptual access to her own developing intention. Important as it is, that case will not be considered in our argument because it mixes conceptual and perceptual expectations.

Three kinds of cases can be used to illustrate the necessity of recognizing a perceptual level where the relevant evidence might be accessed :

1) An agent may act without having formed any prior intention : she just acts on the basis of an occurrent intention-in-action; scratching a bodily part, pacing about a room, opening a door, shifting a gear, hitting a piece of furniture out of anger, may all be performed in a purely automatic, non deliberate way. In that case, to know what she is doing, the agent must gain access "online", so to speak, to the kind of intentional action she is engaged in.

2) An agent may perform several actions at the same time. In this situation of divided attention, she must be able to reassess whether or not her occurrent behaviour conforms to her prior intentions.

3) An agent subject to task interference may forget what the goal of her current movement is.

The view defended here will be that, in these kinds of cases, an agent must rely on a perceptual source of evidence to come to know what she is doing. This will be shown

by checking whether the conditions listed above for perceiving apply to these kinds of situations. Let us start with condition a. Having no belief currently available on her prior intention, an agent is left to rely on specialized captors to extract the relevant kind of information. Those specialized captors - in particular an efferent copy mechanism,¹² that allows a subject to keep track of her own executive commands in the course of an action - exploit a subset of the information available to the senses, namely the stimuli having to do with the anticipated feedback of the intended action. She perceives her own intention as the particular way in which the world is given to her, that is, as a context affording some particular move or presenting some specific motivation-dependent saliences. In other words, an intention can be recognized by the specific structure and dynamics of the perceptual/motor field arising as a consequence of the attentional features associated with the intended action.

There is again a much richer reading of an action context, in which the agent masters a conceptual knowledge structure relative to that context, and hence can use the inferential connections inherent to this structure to deploy her behaviour rationally. An adult agent normally perceives her own intentions in a world already conceptually categorized, just as she perceives the things in the world as being trees, bushes, tables and chairs. In a more basic sense, however, a context of action can be described in terms of vectors and trajectories, salient affordances, things with shapes, weights, colors and fragrances, attractive and repulsive features, and specific transformations. An infant presumably first senses her own intentions in such a sensory way; she recognizes and identifies them through their effects on her environment and her own body (including vision, audition, proprioception, and verbal labeling by parents).

It is a commonplace of phenomenological inquiry that an observer directly perceives the world as offering potential courses of action. The present approach claims in addition that an action transforms the world in a way *internally related* to the intention driving the action.¹³ The agent can thus directly perceive her own intention while her action develops. The meaning of the action lies, so to speak, in the open. The specific organization of her visual field, resulting *inter alia* from her moving intentionally through some particular action space, is part of what is

¹² See Feinberg (1978).

¹³ See Searle (1983) and Proust (to appear 2) for a defense of this view.

perceived, a material indication of what she means to do. Among the relevant features for perceiving the intention driving one's behaviour are : the information on the trajectory, on some of the relevant steps of the action, on the temporal sequence of the various components of the action, on the effort involved in each, on the modifications induced in the environment etc. Visual perception is able to assemble as a single temporally extended batch those changes contingent on the agent's behaviour¹⁴.

Now let us turn to condition b. The kind of access that a subject has to her own intention through the dynamic and qualitative structure of the input is also phenomenological, in the sense that there is a distinctive feeling associated with being the agent of a specific action. First, the way one's body moves is felt differently when the subject is active or passive. The distinctive sense of effort involved in voluntary actions, whether interpreted by Wundt as a "sense of innervation", - namely, as caused by efferent commands to the muscles-, or understood by James as an image of peripheral sensations, seems to offer an important signal for perceiving actions differently when performed by self or passively observed. This distinctive feeling seems, however, to be variable in intensity according to the subject's mood, and may even disappear in "depersonalized" conditions sometimes occurring, for example, in depression and schizophrenia. As we will show below, schizophrenic patients may be said to have defective mechanisms for perceiving intentions.¹⁵ At least in some cases, they seem unable to capture perceptually the dynamic pattern of their actions, thus failing to recognize their underlying efficient intention, just as an agnostic might look at an object composed of a blade and a handle, while failing to recognize a knife.

Beyond the specific impression related to a sense of effort, an agent also has distinctive qualitative feelings associated with both passive and active movements including, as James shows, both the "remote effects of the movement"- that is, the external events it produces - and the "resident effects of the motion" :

¹⁴This information can be later used as providing the content of a visual image for the corresponding intention. Entertaining a prior intention before acting might thus consist in engaging in a goal-directed behaviour either on the basis of a conceptual representation of that goal, or on the basis of a perceptual image of a prior successful token of the corresponding intention. Cf. James, (1890), II, 487

¹⁵ They also have problems with forming intentions, but these perturbations will not be discussed here.

"Not only are our muscles supplied with afferent as well as with efferent nerves, but the tendons, the ligaments, the articular surfaces, and the skin about the joints are all sensitive, and, being stretched and squeezed in ways characteristic of each particular movement, give us as many distinctive feelings as there are movements possible to perform" (James, 1890, II, 488).

But here too various ordinary or pathological conditions may prevent someone from perceiving what he or she is currently doing. De-afferented patients, for example, may fail to identify what they do in case they cannot see their limbs. Subjects with apraxia - who substitute incorrect actions into their own gestures - also have difficulty in recognizing substitution errors in the gestures performed by others and by themselves. In speeded situations, or under toxic influence, normal subjects may also fail to consciously perceive their own intention, and act "without knowing what they do".

In sum : intentions can be perceived or misperceived, prior to their being conceptually identified. Conditions b and c above are fulfilled : even when no conscious *belief* is available of having formed an intention, there is some distinctly phenomenological way associated with perceiving intentions through the dynamic properties in the world contingent on one's agency.

Condition c, that is, the ability to categorize perceived objects and properties, will be accommodated in a different way according to the kind of strategy used to the objections raised above. In a nutshell, the two strategies differ on the moment when categorization occurs : at the conceptual level, in the first strategy, and at a sensory, proto-conceptual level in the second. In both cases, however, we use sensory perception to judge that this (type of) intention is currently being carried out.

Our approach might, however, be put in difficulty by the two last conditions in the list, namely *d* and *e*. According to clause *d*, what causes in veridical instances the relevant perception of an intention should be nothing other than the intention itself, appropriately connected to an intention detection mechanism. According to clause *e*, the perceived intentions should be shown to exist independently from the fact that they are perceived.

Are intending and perceiving one's intentions one and the same event?

Let us start with the first of these questions. How can an intention, that is, some event or state of the "internal" variety, be perceived by an agent as some external

property in the environment? If intention is a propositional attitude with a particular content, the only kind of perception that seems to make sense for it is introspection. The very idea of looking to the outer world to perceive one's own intentions simply seems to make no sense at all. Let us approach this difficulty from a different tack.

As a content of thought, an intention may be analysed by using a classical distinction between *what one thinks*, *what one thinks about*, and *what one thinks about it* (Prior, 1971). When one thinks *that grass is green*, one thinks, about *grass*, *that it is green*. Now an intention is by definition a representation. It differs from other thoughts not through its intentional content per se, but through its direction of fit : world-to-mind as in desire rather than mind-to-world as in belief (Searle, 1983).

Let us examine more closely the intentional content of an intention.¹⁶ When I intend to do P, where P, say, consists in carrying an object O from L1 to L2, three dimensions of thought are similarly to be distinguished : what I *think* is

(1) "I intend to do P".

What I *think about* when I think (1) is some definite property of my target O, that is, the final state of the object's location :

(2) O in L2

What I think *about it* is

(3) that, in order to be in L2, a movement displacing O from L1 to L2 is to be performed.

The present account does not exclude that I may have a *conceptual* access to (1) the fact that I intend to do P, (2) the object with the property on which realizing P depends (the target), (3) what is to be done to reach the target. As was suggested above, a conceptual access allows a subject to memorize an intention as part of a plan in a propositional format. The possibility of knowing an intention conceptually should not however obliterate the possibility that an intention could and even should be identified perceptually, when the agent has no conceptual way of identifying her own current attempt.

Perceptual access to an intention-in-action has to do with the dynamics of an action relevant for its intentional content, that is, with (3). Just as object-related visual perception generally allows for the extraction of a sensory property or event (seeing property *F* in an object, seeing an object undergo some change) and forming a

¹⁶ The expression "intentional content" in all its occurrences in this chapter means "semantic content" rather than the content of an intention.

judgement, (*that grass is green, seeing the breaking of the vase*), perceiving an intentional behaviour allows for the extraction of agent-related information about the dynamic properties of the world related to a target to be reached by her: *I go to the window and open it ; I duck and avoid the stone thrown at me.*

Now the puzzle about external versus internal evidence surfaces again in the following way : is an agent's "perception-in-action" (3) distinct from the corresponding intention-in-action or is it one and the same event? Confronting this question faces a serious dilemma, for if it is recognized that perception-in-action and intention-in-action are two ways of describing the same event, then the attempted theory cannot qualify as a perceptual one. As we saw, one major clause for perception (condition *d* above) is that the world having a property should cause the corresponding perception in the observer. If, on the other hand, it is denied that they describe the same event, then the task becomes one of finding out what kind of relation connects perception-in-action and intention-in-action. What might seem problematic in this respect is that, although an intention has a world-to-mind direction of fit, it can nevertheless be perceived, and hence form the content of a mind-to-world thought. How might the same thought - the intention perceived - be simultaneously world-to-mind (in its executive dimension) and mind-to-world (in its perceptual dimension)? Furthermore, given the time lag between when the intention is formed and when the world is changed, how might an intention be perceived if the world, so to speak, is only about to change?

Answering these questions adequately requests the clarification of the metaphysics of the will. Let us start with the independency clause : how independent is perception-in-action from intention-in-action? Forming an intention is the event through which an action is initiated: when an intention is efficient, the world undergoes a change as a causal consequence of the event of forming an intention. Hence an efficient intention will generally fail to coincide temporally with the dynamics realizing it, and with the corresponding perceptual event. Even in the case of an intention-in-action, where muscle contractions are triggered without any conscious prior intention, the dynamics of the action depend on the cerebral process carrying it out. There must thus exist two events, one in which the premotor cortex is activated (an activation instantiating a given intention), and the other in which the muscular activity with the attached external changes takes place (a corresponding action). It is during execution that the intention is controlling the execution, which

involves in part perceiving the relevant feedback. This gives us license to say that there are two events, one in which an intention is formed, another in which an intention is carried out. It is then only that it can be perceived.

Such an independence is also manifest in the various misfirings that might occur. An intention token may be formed but fail to trigger and/or control the corresponding movement (for example, because some new intention interfered with the former), and therefore fail to offer visual or proprioceptive reafferences. Or it may guide the bodily movements, but fail to be attended to : an agent engaged in a lively conversation, for example, usually fails to perceive her own conversational gestures, for lack of attention (her attention is engaged elsewhere, and, moreover, they have in general a low saliency score for the speaker). If this is granted, then it is correct to claim that the process through which an intention is perceived is distinct from the intention itself, that is, the event-token of a type which normally generates and controls actions of that very kind.

Once the independency clause is secured, we are left with the first question raised above : how is perceiving an intention connected to the intention itself?

How is perceiving related to intending?

We saw above that an intention causes a bodily movement and various changes in the world, which can in turn be perceived. Still the *representational* relation between efficient intention and action should be distinguished from the *causal* connection between two events (forming vs perceiving an intention). There is an *internal* relationship between the representational *content* activated in the intention and the succession of bodily movements and interaction with the world in the corresponding action. Where an intention is efficient, its content is *preserved* in the causal process (from generating an intention to producing a bodily movement). What is preserved is the instruction (3) deployed over time by the action. This explains why a physical action immediately presents its intentional content to a perceiver.

Therefore we do have an answer to the first of our difficulties. There are two distinct events in a causal relationship: the intention being read in the changes it triggers in the perceived environment. The intention and the perception of that intention have the same representational content (see (3) above), but with a different kind of direction of fit. The very difference of fit is a precondition for the intention to

control the action. What is at stake here is not only that the movement executed satisfies what was intended, not only that the properties in the world are changed as intended, but also that this execution occurred and these properties have been changed *in virtue of* that intention. The relatively fuzzy expression "by virtue of" corresponds to the experience referred to above as a "sense of effort". More precisely stated, this experience reflects the capacity to predict the reafferences, that is, to shift directions of fit as often as is needed for a complete execution of the intention.

This kind of case again is not isolated. Consider the case when an agent *A* orders *B* to leave the room. If the order is obeyed, *A* can observe that *B* performs the action requested. What she observes in that case is the kind of feedback that she expects when she utters the order. She perceives (in a mind-to-world direction of fit) a situation in the world that responds to her own intention (with a world-to-mind direction of fit). She expects the event to take place because she wants this event to happen, and uses her own ability and social position to have it happen. Here, too, there is a shift of directions of fit; one cannot act successfully without perceiving (and judging) how the world responds to one's attempt at changing it.

Let us note in passing that the ability to shift directions of fit allows explaining in economical, "presubjective" terms, as to how a subject can get a very basic sense of agency even if she does not grasp the concept of subject (and does not use the first-person pronoun). The sense of being able in a given circumstance to predict and modify the world by intending and carrying out meaningful actions, that is, what is traditionally called the "sense of effort", involves a kind of reflexivity that does not involve any kind of *metarepresentation*. The process of *holding* the conditions of satisfaction unchanged across the shift (from intending to perceiving the intention developing through reafferences) generates an implicit non-conceptual precursor of what could be made conceptually explicit through a metarepresentation such as "I perceive that I have this intention".¹⁷

Now let us come to our final problem, concerning the temporal aspect of perceiving an intention in the dynamics of a movement. The time-lag separating the event of forming an intention from the intention being made manifest in the agent's behaviour should no more be an obstacle to perceiving intentions, as it is for perceiving distant auditory or, in astronomy, visual phenomena. The temporal puzzle

specific to intention does not lie in the fact that it is perceived in a deferred way, -- that is, not the common fact that the event in which it is identified is posterior to the event in which it is generated--, but rather in the fact that it can be perceived even *before* the goal is reached. To answer this puzzle, we need to generalize a property of any kind of perception, that is, its aspectuality. A perceiver may perceive a tree as a tree even though she only perceives the outline of its branches in darkness; one can perceive a bird fly away although what was perceived was a brief flinkering of a wing; similarly one can perceive an intentional process by being exposed to some fragment of a bodily movement.¹⁸ Perceiving another agent's intention may occur either in the attentional posture of someone, or watching her move and displace objects, or by seeing her reach her goal. Similarly for oneself: one's own intention, (besides the usual conceptual means for coding and retrieving it), can be perceived and identified at some point in the dynamics of (3), either very early in the saliences and dynamic projections in the perceived context, or later in the succession of reafferences generated by the bodily movements¹⁹.

Intentions misperceived : types of ordinary failures

Given that there is a capacity for consciously perceiving a developing pattern in the world as the substance of one's intention, a semantical problem arises. When shall we say that an agent identifies *correctly* a dynamic pattern as her intention? Might not the present approach encourage scepticism about intentional content, by allowing an agent to perceive a variety of coherent patterns as self-generated, or reciprocally by preventing her from perceiving her own intention in case the expected effects on the outer world are incongruent or lacking - in particular, when her intention is *not* efficient?

Let us suppose that the agent first forms intention I1, initiates the corresponding bodily movement, but, as a result of an interferent context, does not pursue the intended action : she rather engages in some other intention I2 (for example, she goes to her bedroom to pick up a book, but her intention is interfered with by the prepotent context, and she finds herself undressing (cf. James, 1890). Or, while

¹⁷ On the indexical aspect of such a thought, see Burge (1991) and Proust (to appear).

¹⁸ On this, see Carey et al. (1997), p. 116.

¹⁹ See Roland (1978) and Pribram (1978).

cooking, an agent opens the first available door (which turns out to be to a fridge) instead of the desired door (of the microwave oven, for example). Which intention, in the present theory, will the agent *perceive* -- the initial interfered action or the interfering one? The answer to this question is important: the rationality of the agent depends on her ability to correct, and therefore first to detect a mismatch between the actual dynamics of the scene presented as her realized intention and her intention itself. How might an agent discriminate perceptually a "genuine" from an interfering, context-driven, action (and corresponding intentional content)?

It is interesting to note that, in our examples, an intention supplanted another on the basis of the visual perception of the context in which the current sequence of the action was developing. Sight of a bedroom is associated with a definite bed-time routine, that is, specific perceptual saliences and sequence of actions. James's case exemplifies the general fact that representations of action are normally embedded in canonical context representations. The latter seem to play a major role both in triggering and recognizing varieties of actions.²⁰ What happens in the two cases described is not that the agent *misperceived her interfering* intention, for she correctly saw herself doing what she did (undressing, opening the fridge). And it would be equally unfair to claim that the agent *misperceived her initial* intention I₁, because her action no longer reflected I₁. One should rather say that the mishap occurred not at the perceptual level, but rather at the executive level: the agent failed to maintain across time in working memory the appropriate intention. Context overlap allowed an intention overlap to occur. This overlap was beyond the agent's awareness, and as such was also in some sense beyond her cognitive control.

It is all the more relevant to note that, on the basis of what she perceives as her current intention, the agent may finally *judge* that what she does is not what she meant to do. Perceiving her intention in her current action is a condition for exercising her rational capacity at evaluating it, that is, understanding its irrelevance with respect to her present goal, and finally reviving her initial intention. Obviously, a mismatch can be detected only if what is observed can be compared with what was anticipated: perceiving one's present intentions is a necessary precondition for evaluating one's course of action. As was suggested above, the conceptual content of an intention, as determined when forming it, normally provides a template against which the current perceived intention is evaluated. The

agent who conceptually formed the intention to do R by way of F 'ing gets from perception some specific feedback that may or may not be subsumed under the relevant concepts. As was stressed by William James,²¹ activating a perceptual image of her goal certainly plays a major role in this process. Visualizing in anticipation what is to be done in some context allows evaluating how far the self-induced transformations on the environment are the desired ones, and also helps her guide her attention towards the relevant parts of the context. Where the agent formed an intention which turned out to be non-efficient, there is no dynamical scene developing as a consequence of that intention. Therefore the subject should detect a mismatch by finding no correspondence between anticipated imagery and observed scene.

In some cases, the subject may falsely believe that her intention corresponds to what she can see, whereas in fact what she sees differs from what she does. In an experiment by Fourneret & Jeannerod,²² for example, an agent perceives her intention as drawing a line straight ahead (because this is what she can see on a monitor screen), whereas she in fact draws a line at an angle (responding to an experimental bias affecting the feedback, unknown to her). In such a case, the intention controlling in fact the subject's movement coincides neither with what the subject can perceive nor with her conscious intention. This case, however, does not reflect a failure of the subject's intention detector. It rather expresses a conflict - experimentally orchestrated - between the visual and proprioceptive components in the perception of an intention. A subject might give more weight to her vision than to her proprioception in appreciating her own intention because the current goal to be reached, in its conceptual content, is a visual property [the drawn line *as seen on the monitor screen* must be vertical]. This asymmetry between vision and proprioception associated with the general dominance of vision in humans misleads the subjects into misperceiving their efficient intentions as that of drawing a line straight ahead.

A sceptic might object to this theory that, even though an agent may perceive her current intention, when she actually entertains one, and conceptually recognize it on the basis of perceptual evidence, she might also experience many other predictable

²⁰ Cf. Proust (to appear).

²¹ James (1890), II, 497.

²²See Fourneret & Jeannerod, (1998) and Slachevsky et al., (2001).

stimuli as an expression of her intention. For why after all would not the clouds, say, follow the path which I intend they do? To address this worry adequately, we need to show that an agent is able to discriminate perceptually external events contingent on her action from those which occur independently of her willful activity.

Self-generated/Externally Generated Predictable Stimuli : the Separability Problem

It is part of the phenomenology of perception that an agent *expects to perceptually identify* objects and events of a given kind (where a "kind" may be identified either conceptually, or through specific sensory or spatial cues). In any type of perception, perceivers evaluate whether things are, or fail to be, as expected. The subject may rely on a conscious emotional signal, a specific feeling, to discriminate between highly predictable, and familiar stimuli, or conversely, stimuli that are unusual in their shapes, colors, frequencies, and so on. The intensity of this feeling on a familiarity/novelty scale is triggered by the degree of informational match between an incoming stimulus and stored perceptual regularities.

A predictability signal cannot, however, be sufficient to determine that some perceived change is a result of one's own intention. One might even worry that the feeling of predictability in fact constitutes an additional source of confusion rather than a distinctive cue in perceiving intentions; for if this information was all that was available, an agent would have much trouble discriminating the self- versus the externally-generated equipredictable events.

A traditional response to this worry is that an agent feels the world differently when the perceived external changes are contingent on her action or independent from it. This "sense of effort", also called "sense of innervation",²³ was subject to a hot controversy in the nineteenth century: is the effort felt when initiating an action a result of the feeling of resistance from the world, or a direct expression of the causality of consciousness?²⁴

In a functional perspective, recent empirical data suggest that there is a grain of truth both in a peripheralist and in a centralist view of sense of effort: on the one

²³ To be distinguished from the sense of muscular tension : See Roland (1978).

hand, this feeling is directly related to world-directed perception ; on the other hand, such a perception is compared with a feedforward model of the developing dynamical context (Blakemore et al., 1999, 2001). The sentiment of self-induced predictable stimuli might depend *inter alia* on the intervention of a neural structure - the superior colliculus - which, in the case of a self-generated action, integrates sensorimotor (visual or auditive) information, while failing to be activated when predictable stimuli are not self-generated²⁵. In this theory, a subject does not need however to *consciously* represent the postulated feedforward model of her action to be able to identify a change in the environment as self-produced. A distinctive sense of the effort applied on bodily movements is the felt counterpart of the neuronal connections allowing her to identify which perceived environmental changes are self-produced²⁶.

Intentions misperceived : types of pathological failures

If the discussion above is on the right track, two different kinds of misperception of one's intentions should occur, according to whether the content of the intention, or the intentional marker, is respectively misrepresented.

The first kind of problem is common, affecting in particular subjects sensitive to interference (aged subjects). In these common cases already described above, an agent fails to keep track of her goal while acting, and as a consequence misperceives her initial intention. A contextual overlap may lead an agent to be perceiving intention I1 while in fact the motor sequence was initiated by intention I2. Such a mishap does not result, as we saw, from a perceptual failure, but rather from an instability of the intentions driving behaviour combined with the ambiguity of the reafferences (equally compatible with I1 and I2).

A less ordinary type of case, characteristic of schizophrenic delusion of control, arises when an agent correctly detects that an intention has developed, individuates

²⁴ A detailed analysis of the arguments offered respectively by peripheralists and by centralists cannot be developed here. See James (1890), II, ch XXVI and Jeannerod, 1983, ch. VI, for a review of this controversy. See Gandiviva, 1987, for a recent defense of a centralist perspective.

²⁵ Stein et al., (1995), Blakemore et al., (1998).

²⁶ Another aspect of the conscious experience of agency emphasized in Blakemore et al. (2001) is the attenuation of self-induced auditory or somatosensory sensations. This is why one cannot tickle oneself.

its content correctly, but fails to perceive it as self-generated. In those cases, the agent lacks the impression of "being in charge"; she may further perceive incorrectly that some particular action of hers has been performed *through* her, rather than *by* her²⁷. Note that the problem originates at a perceptual level, and not at a conceptual one : the perceiver eventually fails to attribute to herself an action because she initially failed to perceive the marker of effort while she acted, not because her access to mental concepts is defective²⁸. Although such an agent is able to perceive the intentional content of her current action, and acts intentionally, she does not perceive it as self-generated, but rather as other-generated (for lack of an internal feedforward model of her action, if the supposition above is empirically correct).²⁹

A symmetrical delusion in schizophrenic patients consists in perceiving others' intentions as their own. In such a case, a patient may be induced to take up someone else's role by completing or echoing the perceived action. Again, the difficulty may arise from the inability to discriminate, among predictable stimuli, those that are contingent on one's own intentions.³⁰

Perceiving one's Intentions and Self-Knowledge

If the view defended here is right, then it sheds a new light on the role of perception in so-called introspective knowledge, more exactly as a precursor of self-knowledge. As many philosophers have claimed,³¹ a belief concerning the self cannot be gained perceptually as if the self were a thing one observes in one's environment. There is no such thing as introspection, if by "introspection" is meant an inspection directed to internal states. Still a world-directed kind of perception may be a source of

²⁷ Some patients seem on the contrary to misperceive intentions where there are none, that is, to look at the world as permeated with cues for a possible action. We will not address here the details of the pathology. See Proust (2000a) for a discussion of the current theories.

²⁸ On this question, cf. Feinberg, I., (1978), Campbell, (1999), Proust, (2000a).

²⁹ This case has been contrasted in Frith et al., (2000) with the symmetrical case of the anarchic hand sign. In the latter case, the hand contralateral to a lesion in the SMA performs goal-directed movements which are, so to speak, unintended and intrusive. Although the patient perceives the intentional content of these movements, she does not perceive them as caused by alien forces. Such a patient has a problem of control, while the schizophrenic patient has a problem of awareness of control.

³⁰ One might speculate that this problem might result from an over-activity of the parietal area, leading a subject to reinterpret other people's intentions in egocentric terms. Cf. Jeannerod, (1999b).

³¹ See among others Evans (1982), Shoemaker (1996).

knowledge about oneself, as Evans already appreciated.³² A paradigmatic "internal" state like intention can be directly perceived in the world, whether by the agent or by an observer, in the dynamic pattern of the subject's interaction with objects and people. Moreover, a specific marker in the developing pattern allows an agent discriminate among various features in the scene those changes contingent on her action, giving her simultaneously a distinctive feeling of agency. Such a feeling is a constitutive part of the experience of self-directed perception-in-action. When the complex informational processing mechanism underlying the identification of self-generated changes is defective, the agent is no longer able to detect her own agency in the outer world. She becomes subjectively "acted through".

Shoemaker (1996) discusses a similar case in an argument to the effect that self-blindness about intentions is incoherent. According to him, the potential incoherence of the case inheres in the fact that a subject has to possess an integrated self to disavow an intention; otherwise the case might be described as involving two subjects in a single body, the "agent" and the "agnostic" (that is, the person disavowing the intentions). These two roles only qualify as facets of one person if the agnostic's beliefs and desires do rationalize the agent's actions and if she (the agnostic) has the corresponding knowledge. Shoemaker concludes that it is necessary to have introspective knowledge to one's beliefs and desires "if one is to have any access *at all* to one's intentions, volitions, and actions"³³.

Such a conclusion is much too strong, however. If the view defended here is correct, then one can have a perceptual access to one's intentions, at least in the restricted case of simple physical actions, even though no access to the (conceptual) content of one's beliefs or desires is currently available, just as one can have access to others' intentions in a direct perceptual way, without further information concerning the observed agents. Concepts of types of action, as well as inferences from objects to affordances, will allow for the categorization of the perceived contents and for the prediction of behaviour in others in a richer way, as was acknowledged earlier. The point is that informational access to intentions is not *constrained* by the possession of concepts.

³² "Any informational state in which the subject has information about the world is *ipso facto* a state in which he has information about himself, of the kind we are discussing, available to him. It is of the utmost importance to appreciate that in order to understand the self-ascription of experience we need to postulate no special faculty of inner sense or internal self-scanning" (Evans, 1982, 230).

When a schizophrenic patient denies having acted with a particular intention, and even having acted at all, he/she may or not have beliefs and desires rationalizing the corresponding type of action. Where she does not, we might be tempted to say that she has grounds for supposing that some other agent (with the relevant rationalizing beliefs and desires) *made her act*. But this temptation should be resisted, because the impression of being or not the agent in one's actions is not *inferred* from what one believes and desires. It is a genuine, direct feeling, experienced dynamically in the changing world, a feeling functionally independent from the specific content of the corresponding intention. A patient may in fact feel "acted through" in actions she values as well as in actions she loathes.

Another difficulty plaguing discussion of self-blindness about intentions consists in the failure to distinguish several levels in self-knowledge. Although it is tempting, and in many cases right to say that the mechanism for perceiving one's intentions is a source of self-knowledge, it is not entirely correct. An agent only may, properly speaking, have self-knowledge if she can form first-person thoughts, namely, thoughts referring to the person having that thought according to a token-reflexive rule, and if she is able to apply this rule in a general way, that is, as available to other subjects.³⁴ An agent may, however, have thoughts that are in fact about himself without realizing that he is having them; not only in the sense in which Oedipus thinks that whoever slayed Laius should die, that is, while utterly failing to capture any reflexivity in the thought content, which, unknown to the thinker, is in fact reflexive; but in the sense in which an agent may build up self-directed thoughts while failing to have a concept of self. These latter thoughts can be said to be self-directed either because they allow practical reflexivity to develop - as when an agent identifies the target of a threat as herself, and flees; or because their content is such that it involves the agent essentially (like proprioceptive informational states). The important point is that full-blown self-knowledge would not be possible if there were no elementary steps through which an agent comes to grasp her functional integrity.³⁵

Acknowledgments

³³ Shoemaker (1996), 235.

³⁴Cf Evans's Generality constraint (1982, 209).

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³⁵ See Bermudez (1998) for a full defense of this concern.

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