Chapter 1

PRACTICAL RATIONALITY

In this chapter we shall sketch a general account of practical reasoning, in order to provide the basis for our model of legal reasoning. This reflects the idea that legal reasoning can be viewed as an application of a more general human competence, which we call *practical rationality*. Practical rationality is a fundamental aspect of *rationality*, by which we mean the appropriate way of processing information through reasoning. As we shall see, practical rationality complements *theoretical rationality*, the other fundamental aspect of rationality.

The account of practical and legal reasoning in Part I of this volume is going to be informal. In Part II, some of the notions introduced will be made more precise, and will be characterised with the help of a (moderate) logical formalism.

1.1. Implicit Cognition

Rationality is a capacity that cannot be appreciated in isolation, as a feature of a disembodied pure intelligence: It is a function that is performed by real agents and it is grafted on the top of other cognitive capacities of such agents.

As we shall see, rationality is a significant addition to these other cognitive capacities, since it provides a flexible way of extending, controlling and refining their output, but it would be a useless symbol grinding mechanism if it were separated from them. Therefore, to appreciate the role of rationality, we need first to analyse other forms of information processing, which we group under the heading of *implicit cognition*. These forms of cognition include those ways of information processing that take place within an agent, but are inaccessible to the consciousness of the agent itself,[1] though the agent may have access to their outcome. We shall distinguish two basic types of implicit cognition:

- *fixed reflexes*, which are hard-wired into the agent, and
- *conditioned reflexes*, which are dynamically adapted to the environment.

[1] We use the term *agent* in a very general sense, namely, to refer to any entity capable of autonomous action. This includes not only humans, but also animals and even some artificial entities, like physical robots and virtual ones (the so-called software agents). On the agency of autonomous automata, cf., among the others, Pollock 1989; Pollock 1995; Wooldridge 2000, 1ff.; for a legal discussion, Bing and Sartor 2003. On rule-governed interaction of software agents, see Artikis et al. 2002.

We shall then consider those more complex cognitive functions that are provided by specialised cognitive organs.

1.1.1. Fixed Reflexes

Fixed reflexes connect certain environmental inputs (impacting on the agent's sensors) to certain behavioural responses. These reflexes never change during the agent's life. An agent having only fixed reflexes is incapable of learning, since its behavioural responses are completely determined by the input-output function that is implemented into its physical make-up: Every time the agent receives a certain type of input, it will reply with the same kind of action.

For such agents, learning may take place only with regard to the species, thanks to *evolution*. If the reproduction mechanism of a species is capable of producing variations, then those variations will preferentially survive and reproduce, which have reflexes that are best fit to the environment. Therefore, the species will "learn" (become more adapted to its environment), as the generations pass one unto another, even if the behaviour of each individual is unchangeably defined by its input-output functions. As Popper (1976, sec. 37, 179ff.) observes:

> Life as we know it consists of physical "bodies" (more precisely, structures) which are problem solving. This the various species have "learned" by natural selection, that is, to say by the method of reproduction plus variation, which itself has been learned by the same method.

Agents having fixed reflexes can be biological ones, such as viruses, bacteria, plants, animals, but also artificial ones, such as certain robots and computer programs. In the latter case, the reproduction mechanism is usually the process of fabrication, rather than self-replication, while variation and selection will be operated by experiments and choices of designers, rather than by natural selection (though the development of new artificial agents through self-replication is increasingly popular, as in genetic approaches to computing). In humans, fixed reflexes provide for all basic bodily functions, from processing food, to preserving blood pressure and bodily temperature, to the first phases of processing sensory inputs.

It is important to remark that, even if evolution (or the project of the agent's creator) has given an agent reflexes which are adapted to the agent's environment (i.e., reflexes which provide for survival of the agent and persistence of its species), an agent having fixed reflexes is not reacting directly to its chances of survival and reproduction. There is no teleology at work, as far as the individual is concerned. The individual agent is only blindly reacting to certain features of its environment, as its sensors perceive them.

Teleology, in a sense, works at the level of the species, through selective evolution: The species may change so as to meet the requirements of the environment (thanks to the higher reproductive success of agents having better-adapted reflexes). Consider for example, how viruses tend to evolve into forms that are not attackable by the available drugs. More generally, Darwinian evolution will tend to endow species with biological solutions that are appropriate to their survival problems: In this sense we may say that evolution engages in a kind of design work, if this is generally understood as "the work of discovering good solutions for problems that arise" (Dennett 1996, 133).

1.1.2. Conditioned Reflexes

A more complex type of implicit cognition is provided by *conditioned reflexes*, that is, by the mechanism of *operant conditioning*, the key idea of behaviourist psychology (Skinner 1953). Agents endowed with conditioned reflexes have the capacity or *learning*, by acquiring and modifying their reflexes. Let us consider briefly what architecture may underlie such capacity.

First, there are certain states of the agent that act as *positive reinforcers* for its reflexes. This means that when an action, triggered by a certain input, produces a reinforcing state, the agent will increase its tendency to replicate this action in the future, in response to the same type of input: The activation of the positive reinforcer will start or strengthen the activating reflex. Similarly, there are other internal states that act as *negative reinforcers*. This means that when an action, triggered by a certain input, activates a negative reinforcer, the agent will tend to refrain from responding to that input with that action: The activation of the negative reinforcer will weaken or even cancel the activating reflex.

Conditioned reflexes are not rigidly fixed: They can change, according to the impact of practising each reflex on positive or negative reinforcers. Reinforcers, on the contrary, are usually embedded in the agent's architecture, and they are linked to physiological states that usually favour the survival of the agent (though they may be reinforced according to the impact of their satisfaction on further, higher level, reinforcers).

Secondly, to be capable of acquiring new conditioned reflexes (of learning them) an agent also needs a mechanism for generating some variations in its behavioural responses to external stimuli. The variations that activate a positive reinforcement will then tend to be transformed into new reflexes.

Such a learning mechanism can even lead to the modification of the reflexes, that is, to their *generalisation* (extension to further inputs) or to their *specialisation* (restriction to a reduced set of inputs). On the one hand, when a behavioural response, originally linked to a certain class of inputs, results in positive reinforcement after being practised with regard to a new input, that response can be linked also to the new input (generalisation). On the other hand, when a behavioural response, originally linked to a certain class of inputs, results in negative reinforcement after being practised with regard to a particular instance of that class, the corresponding reflex can be specialised (the class of inputs which activate the reflex is restricted), so that the response is no longer triggered by that particular input (specification). For example, animals may expand the range of the foods they tend to approach, after enjoying new foods, or may restrict it after bad gastronomic experiences.

Finally, conditioned reflexes provide an unconscious form of analogy, being susceptible of being activated also by inputs that that are only similar to those which were experienced by the agents in the past.

We cannot consider here the type of mechanisms that provide an agent with conditioned reflexes. In fact it seems that conditioned reflexes can be implemented in similar ways into different types of structures, from biological ones, as in neuronal connections in brains, to electronic ones, as in electronic neural networks.[2] In any case, an agent endowed with conditioned reflexes is characterised by the disposition to react to certain situations with the activation of a reinforcer, and by the capacity of strengthening the reflexes that are followed by (the production of such situations and therefore by) the activation of a positive reinforcer.

Consider, for example, a robot that moves in an environment where plugholes with different shapes are available, each type of plughole being susceptible of providing the robot with a different amount of electricity. Let the resulting increase (decrease) in the electrical charge of the robot be the positive (negative) reinforcer for the act of plugging into different kinds of plugholes. We can expect that such a robot, after exploring the available holes, will tend to (will have "learned to") plug into those holes-shapes that provide it with more electricity, and to avoid those holes-shapes that provide less or no energy.

We have spoken loosely of positive and negative reinforcers, meaning those internal states that determine a positive or a negative reinforcement. We may want to give a bio-psychological interpretation of this notion, assimilating positive reinforcers with pleasure and negative reinforcers with pain. However, this way of speaking may be sensible only with regard to humans and more sophisticated animals, while being inappropriate for computer devices and probably also for simpler types of animals.

It is also necessary to avoid viewing an individual agent endowed with conditioned reflexes as necessarily aiming to achieve its own survival and reproduction. A reinforcer is activated by certain situations (more exactly, by the sensorial input available in such situations) and not directly by the prospects of survival and reproduction characterising those situations.

It is true that selective evolution tends to ensure a correspondence between the situations activating a positive (negative) reinforcer and the situations con-

[2] On neural networks the classical reference is Rumelhart and McClelland 1986; on the use of neural networks to model legal cognition, see Philipps 1989, Philipps and Sartor 1999a and the contributions in Philipps and Sartor 1999b. On neural network and legal reasoning, see also: Zeleznikow and Stranieri 1995; Hunter 1999; Bourcier and Clergue 1999; Merkl et al. 1999.

tributing to (detracting from) the survival and reproduction of the agent. However, this happens only in the long term: In rare or new circumstances, it may happen that the agent's reinforcers (its drives) make it subject to damage or death.

Consider again the conative robot of the example above. What if new plug-holes are introduced with a voltage exceeding the capacity of the robot? The robot (driven by its craving for holes providing more electricity) will insist in plugging into the high voltage holes, until it burns its circuitry. Similarly, let us assume that the favourite food of an animal becomes polluted, so that continuing to eat it will cause the animal's death, without producing any pain in the animal (or at least without producing any pain immediately after consuming the food). Then, eating the food, although not activating any negative reinforcer (or even being accompanied by pleasure) will cause the animal's death. Something similar may happen also to humans. Consider, for example, how our tendency to feed ourselves as much as we can (reinforced by the pleasure of eating) has been a powerful help to survival in times of scarcity, but may nowadays put at risk our health.

The mechanism of conditioned reflexes is a very important way of learning also for humans. It allows humans to get very complex forms of implicit knowledge, which may drive them to the right responses (on the basis of past pleasurable experiences, and of satisfaction associated with success or reward) even when they are not aware of the reasons why such responses were right. This is the kind of knowledge to which Hayek (1977, 41) refers, when he observes that:

> what we call knowledge is primarily a system of rules of action assisted and modified by rules indicating equivalences or differences of various combinations of stimuli.

In connection with our tendency to *imitation*, conditional reflexes provide an important mechanism for *social learning*. Individuals tend to imitate the behaviour of other people, especially when those people are successful or approved in their community, and tend to replicate their own behaviour when it is successful or approved.

1.2. Explicit Cognition

In some sense, a *reactive agent*—which has inherited a set of fixed reflexes and has developed or fine-tuned a set of conditioned reflexes—possesses some *implicit knowledge*: The agent's functioning is adapted to its environment, since its reflexes provide appropriate solutions to the survival and reproduction problems that the agent is likely to meet. In fact the mechanism of inborn and conditioned reflexes is a very powerful one, and many experiments have shown that reactive agents can perform impressively well in various tasks, from recognising forms and shapes (as in scanning devices), to playing football (as in robot tournaments), to making business decisions (like investments in the stock market).

However this mechanism only provides us with a partial account of the operation of cognition. When considering reflexes, we only focus on *implicit knowledge*, namely, on knowledge that is inherent to the way an agent is built (fixed reflexes), or to the way it developed, interacting with its environment (conditioned reflexes). With regard to implicit knowledge, there is no internal state of the agent, which is specifically intended to represent this knowledge in such a way that the agent may use it as a basis for its further internal processes or external behaviour. This distinguishes implicit knowledge from *explicit knowledge*, namely, knowledge which is represented inside the agent, in such a way that it can be accessed by the agent itself. The use of explicit knowledge (through appropriate cognitive organs) characterises what may be called a *cognitive agent* in a proper sense.

In considering a developed cognitive agent, we need to move beyond the mechanism of reflexes, and thus, beyond *behaviourism*, the approach to psychology which focuses on the connection between external inputs and observable behaviour, disregarding the internal cognitive processes of the agent. We need rather to focus on the specific processes that characterise cognition: According to the approach of *cognitive psychology* we need to analyse the ways in which information is internally processed. This leads us to distinguish different cognitive functions, which are performed by different cognitive organs, both in epistemic and in practical cognition.

1.2.1. Cognitive Functions and Cognitive Organs

We cannot here consider the many theories of various cognitive functions. Just to give an idea of the approach of cognitive psychology, let us recall Marr's (1982) theory of *perception*. According to this theory, the functioning of perception can be explained by distinguishing four modules, which work in sequence, providing the following outputs:

- a representation of the image in the retina (of the intensity of light at each point of the retina);
- a primal sketch, which identifies potentially relevant areas of the image, and their geometrical connections;
- a $2\frac{1}{2}$-D sketch, which makes explicit the orientation and depth of visible surfaces, relative to the observer;
- a 3-D representation, where shapes and their spatial organisation belong to specific objects, independently of the observer's position.

Marr's approach shows how, according to cognitive psychology, one cannot approach the mind as a black box, the behaviour of which is fully determined by environmental inputs, as in operant conditioning.[3] On the contrary, one can understand a complex cognitive function only by distinguishing the cognitive modules that realise this function, and by specifying the ways in which these modules operate and interact.

Similarly, Chomsky famously argued that our *language* faculty, like other human cognitive faculties, does not reflect the circumstances of our environment: It is rather a complex *mental organ*, which develops, like physical organs do, according to its own (genetically determined, that is, innate) structure:[4]

> The capacity to deal with the number system or with abstract properties of space—capacities that lie at the core of what we might call the human "science forming faculty"—are no doubt unlearned in their essentials, deriving from our biological endowment. [. . .] These systems have many of the relevant properties of physical organs. We might think of them as mental organs. Thus the human language faculty might well be regarded on the analogy of the heart or the visual system. It develops in the individual under the triggering effect of experience, but the mature systems that grows in the mind [. . .] does not mirror the contingencies of experience, but vastly transcends that experience. (Chomsky 1987, 420)

According to this author, only some linguistic parameters are provided by the environment (in particular, by the examples given by other speakers), and these parameters provide for the differences between different natural languages, all of which are applications of the same basic mechanism.

From this perspective, the production and the comprehension of linguistic expressions are no adaptations to external stimuli, and in particular are not learned through conditioning. They result from the speaker's possession of a *grammar*, that is, from the fact that the speaker's language organ has been parameterised in such a way as to be able to cope with (produce and decode) the sort of linguistic tokens that the speaker finds in the environment.

The grammar that the speaker has adopted defines the speaker's *linguistic competence*, and can be expressed through a set of rules. One is usually not aware of the grammar one follows, but one applies it unconsciously, when one engages in linguistic performance, namely, when speaking or listening.

The idea that the mind is to be viewed as a set of connected mental organs, whose working is genetically determined, is expressed in general terms by Pinker (1999, 21):

> The mind is what the brain does; specifically the brain processes information, and thinking is a kind of computation. The mind is organised into modules or mental organs, each with a specialised

[3] For a synthetic account of the psychology of perception, and some references, see, for example: Gross 1996, 201ff.; Gregory 1987; van Leeuwen 1998.

[4] Among the many publications in which Chomsky provided and refined his model of our language organ, identifying the common structures of the grammars which enable us to generate correct linguistic expressions (generative grammars), let us just mention Chomsky 1957, which started a revolution in modern linguistic. On the idea that language is genetically determined faculty, see also Pinker 1994.

design that makes it an expert in one arena of interaction with the world. The modules' basic logic is specified by our genetic program.

1.2.2. Reason As a Mental Organ

Here we shall not discuss any longer the cognitive models of various mental faculties, nor shall we address the controversies concerning the extent in which they are innate (determined by human DNA) rather than resulting from environmental inputs (for an interesting introduction to this issue, see Ridley 1999). We shall just focus on *reason* or *reasoning*, which we tend to view as a *mental organ*, like Marr's perception modules or Chomsky's language faculty.

Let us just observe that for Chomsky linguistic competence is an individual possession, rather than a social entity. Here is how he criticises the view that language is a social fact:

> This "externalized language" that Jones and Smith share must be an abstract object of some sort, a property of the community, perhaps [. . .]. Suppose that Smith and Jones have more or less the same shape; we do not conclude that there is a shape that they partially share, and the interactions between Smith and Jones give us no more grounds to suppose that there is a language that they share. (Chomsky 1993, 39–40)

We largely share Chomsky's focus on individual linguistic competence (I-language) and the rejection of social hypostases. In the following, we shall tend to present *rationality* in a similar way, namely, as a "mental organ" that belongs to the individual mind, to the individual psychology. According to this psychological approach the inputs of rationality—its reasons—will be constituted by certain mental or *cognitive* states of the individual reasoner.

Our focus on individual minds (our methodological individualism), as we shall see in the following, does not exclude the communal aspects of human cognition: We accept that, both for language and for reason, individuals use (or, better, "parameterise") their natural organs in such a way as to reproduce those schemata that are practised in their societies (as observed by Millikan 2002), and that they may use such organs to engage in collective cognitive enterprises, and submit to the rules and constraints which are appropriate to such enterprises.

However, we believe that our distinctively cognitive approach, rather than renouncing to capture the social aspects of legal reasoning, provides—compared to purely behavioural accounts—a deeper understanding of such aspects and has higher explanatory power.[5]

[5] This way we hope to be able to overcome criticisms like those that Patterson 2003 raises against cognitive approaches to the law (in particular, Patterson addresses the psychological models of categorisation in Winter 2001, and Amsterdam and Bruner 2000).

In fact, we can understand and forecast people's action in every-day life only by moving beyond observable behaviour and attributing to people cognitive states: We need to try to "understand people's behaviour by coming up with explanatory hypotheses about their beliefs, goals, etc." (Haack 2003a, 166).

Moreover, we can attribute such cognitive states—when no direct evidence is available—only by assuming that people engage in reasoning, i.e., that they often move from possessed cognitive states into new ones according to rationality. We need to adopt this perspective (to view people as carriers of cognitive states, which they often process rationally) in order to understand many social phenomena, and in particular the law.[6]

Our particular perspective—approaching reason as a mental organ, coupled which viewing reasons as mental states—allows us to set aside the distinction between *guiding reasons* and *explanatory reasons*, the first being intended as the facts that justify performing certain actions, the second as the facts that explain why certain actions were performed (on this distinction, see Raz 1975, and Hage 1997, 35).

Since we are interested in the working of reason as a mental faculty or organ, the mental states that lead rationality to draw certain conclusions, according to its correct way of working are necessarily *both* (1) guiding and (2) explanatory:

1. they should lead us (our reason-organ) to such conclusion, since this is what reason does when it is properly working, and at the same time
2. they do lead us to such conclusions, when we properly apply our rationality.

Clearly, the use of rationality as an explanatory hypothesis requires that humans have, as a matter of fact, the faculty of rationality and use it, at least in some occasions.[7]

1.2.3. Epistemic Reasoning

In examining a cognitive agent we need to distinguish two types of cognition: *epistemic cognition* and *practical cognition*.

[6] For a defence of the specific explanatory function of mental states, though inclining towards a dispositional account of them, see Haack 1993, 170ff. The idea of *Verstehen* (understanding), intended as the attribution of mental states to social actors, plays a central role in German historicism (see, for instance, Dilthey 1991) and in Max Weber's sociology (see Weber 1947, 87ff.). On understanding, see also von Wright 1971.

[7] Though there are various social mechanisms (like imitation, or selective evolution) that make humans behave as if they were rational, even when they are not using their rationality. We cannot here discuss this issue, which is related to the well-known and much discussed problems of the explanatory value of economic theories, which typically embed rationality assumptions. This is an issue that has also been discussed with regard to using economic models in the law (Posner 1983, 2ff.), or in politics (Pettit 1993, chap. 5).

Epistemic cognition consists in the agent's capacity of forming internal (mental) states that have the function of representing aspects of the agent's world. We call such states *epistemic states*. We distinguish two types of epistemic states, percepts and beliefs.

Percepts are mental states that are caused by the various mechanisms of perception, which are activated when some input is provided to the agent's sensors (on the distinct cognitive function of percepts and beliefs, see Pollock and Cruz 1999, 84ff.). Perception may concern the external environment (heteroception: sight, hearing, touch, smell, and taste) but also the state of the agent's body (proprioception: the perception of the position and movements of one's limbs).

A *belief* consists in the endorsement of a proposition. To believe a proposition means:

> to adopt it as a basis for further attitudes, choices and behaviour, i.e., to consider the information expressed by it as correct and proceed accordingly in thoughts, and actions. (Lehrer 1990, 36)

In other words, to believe a proposition means to adopt it as a premise of one's reasoning and acting, that is, as something one is ready to think and act upon. We shall put a very low threshold in the "quantity" of endorsement required for belief (on a gradual approach to belief, cf. Haack 1993, 90). So we shall say that one believes a proposition, not only when one is absolutely certain about that proposition, but also when one is aware that one's evidence for that proposition may be overridden by evidence to the contrary (when the belief is defeasible, see Section 2.2 on page 55). We also speak of a belief in a proposition when one only adopts the propositions as a *hypothesis*, i.e., as a premise for one's further epistemic inquiries, but not (yet) for one's action.

An agent endowed with the faculty of epistemic cognition processes external inputs and obtain epistemic states. Then the agent reasons, producing new mental states on the basis of the epistemic states the agent already has. *Epistemic reasoning* is indeed the process through with one builds new epistemic states moving from the epistemic states one already possesses.

Consider, for example, my mental process when I see my youngest child with a broken knee. First my brain will process the visual input provided to my eyes in such a way to provide a perception of the body of the child. My having this mental state (this perception) will start my reasoning. On the basis of this perception I will form the belief that indeed the child has a bodily lesion having certain features. On the basis of the latter belief (and the knowledge I already possess) I will form further beliefs, concerning possible consequences of the injury, the appropriate medication, the time required for the injured child to recover, the type of event that caused the injury, and so on.

Obviously, the same kind of mental process may also take place in a legal framework. Consider for example, how a judge—having to decide a case where compensation is requested for an injury resulting from a traffic accident—will approach the cognitive task of establishing the features of the injury, its causes, its likely effects. Though the cognitive process of the judge will be also governed by various procedural constraints, within those constraints the judge's cognition will be governed by (and criticisable according to) epistemic rationality.

The reasoning process we have just exemplified, namely, the process of epistemic reasoning, does not proceed randomly: It tends to follows certain schemata, it implements certain procedures. Those schemata and procedures, as we shall see, constitute what we may call *epistemic rationality*.[8]

Assume for example, that I believe that ⌈if the injured knee is dirty, then it may develop an infection⌉[9] and that I also believe that indeed ⌈the injured knee is dirty⌉. This would lead me to believe that the injured knee of the child may develop an infection. Such inference would happen according to a pattern, or *reasoning schema*, which we call *detachment*,[10] and which has the following structure:

Reasoning schema: *Detachment*
(1) believing that A; AND
(2) believing that ⌈if A then B⌉
——— IS A REASON FOR
(3) believing that B

As we shall see in Chapter 2, by a *reasoning schema* we mean in general a transition schema between mental states: A certain combination of certain mental states of the agent, which we call the *precondition* or the *reason* for the application of the schema, leads the agent to having certain other mental states, which we call the *postcondition* or the *conclusion* of the schema.

When the reason is composed of distinct mental states, we say that each one of those mental states is a *subreason* of the schema, and when the conclusion is composed of distinct of mental states we say that each one of those mental states is a *subconclusion* of the schema.

When one reasons, one tends to produce instances of one's reasoning schemata. For example, the schema *detachment* above may be instantiated as follows.

[8] We prefer to use the term *epistemic rationality* when specifically referring to the use of reasoning for getting to factual (epistemic) conclusions, rather than the term *theoretical rationality*, since we shall extend the notion of a theory also to the practical domain (see Section 4.1.4 on page 125).

[9] We use symbols "⌈" and "⌉" to enclose propositions, in particular when we need to specify the scope of an operator which applies to propositions (such as "believing that" or "knowing that"). We shall omit these symbols when the concerned proposition can be immediately and unambiguously detected.

[10] Another name for this reasoning schema is the medieval locution *modus ponens*, or more exactly *modus ponendo ponens*, meaning "the proposing (affirming) method."

Reasoning instance: *Detachment*

(1) believing that the injured knee is dirty; AND
(2) believing that ⌈if the injured knee is dirty, then it (the injured knee) may develop an infection⌉

——— IS A REASON FOR

(3) believing that it (the injured knee) may develop an infection

1.2.4. Practical Reasoning

The practical side an agent endowed with epistemic cognition can still correspond to the model of built-in or conditioned reflexes: These reflexes will be activated by the agent's epistemic states, rather than directly by sensorial input. For example, my believing that food is coming (rather than directly my smelling the food) may start salivation; my believing that something dangerous is happening may determine a state of alert (muscular tension, accelerated cardiac palpitation, and so on).

However, the benefits of epistemic cognition will be mostly significant to agents who can also engage in *practical cognition*. Like theoretical cognition, practical cognition consists in the capacity of forming internal (mental) states. The difference is that these states are not intended to represent the agent's environment: Their function is rather that of guiding the deliberative process of the agent, of playing a role in the process that leads the agent to determine its behaviour.

We call all such mental states (like desires, goals, intentions, and wants) *conative states*. An agent endowed with the faculty of practical cognition possesses conative states, and has the ability of forming new conative states on the basis of its current epistemic and conative states. Practical reasoning is indeed the process through with an agent builds new conative states on the basis of the epistemic and conative states it possesses.

For example, assume that I like ice creams. If I also believe that it is possible for me to get ice creams, then practical reasoning will lead me to have a desire to have one. This desire—together with my beliefs about where ice cream shops are located (there is one near the corner, and another a little further away), their quality (the shop further away is a little better than the nearby one), the money I have in my pocket, etc.—will lead me to make plans on how to satisfy this desire and to inquire on the relative merit of such plans (should I go to the nearby shop, or to the further away, but better one?).

Then, practical reasoning will lead me to adopt one of those plans, in consideration of its advantages (how much I will like my ice cream) and its costs (going there, spending some money, etc.), and also of how it interferes with plans for achieving alternative goals (for example, I may have a plan to keep on working without interruptions to respect a deadline).

Once I have adopted a plan and I have formed further beliefs concerning the circumstances of its implementation, practical cognition will lead me to intend to implement the various steps of my plan. This will lead me to want to implement each one of these steps (getting dressed, getting out of my house, going to the ice cream shop, and so on) when the right time comes. Finally, I will behave correspondingly.

We believe that the processes we have just described—through they lead to practical determinations rather than to epistemic ones—pertain to *reasoning* and *rationality*. Like theoretical reasoning, also *practical reasoning* is a sequence of transitions between mental states. Like theoretical reasoning, also practical reasoning does not take place randomly: It takes place according to certain patterns or standards. These standards constitute the correct way of reasoning with conative states, that is, they constitute *practical rationality*.

1.2.5. The Foundations of Rationality

Our description of (epistemic and practical) rationality as the correct way of reasoning leads us to the philosophical issue of the foundation of rationality (for a discussion, cf. Pollock and Cruz 1999). Why should we consider certain reasoning schemata, and not certain others, as being correct ways of reasoning? For instance, why should we accept *detachment* and reject *wishful thinking* (moving from desiring that a state of affair holds to the belief that this state of affair indeed holds)? We may consider here two possible foundations.

The first is an *internalistic foundation*. We, being rational agents, know how to reason and can tell when we reason correctly and when we do it wrongly. In other words, even when we cannot make our own reasoning schemata explicit, we can monitor our own reasoning, and establish whether it is proceeding correctly or wrongly (though the monitoring process is fallible too). Thus, there is a judge for reasoning, which is reasoning itself (or the rational agent): Our rationality consists in reasoning according to schemata that our reasoning certifies as being correct. This Kantian foundation (reason is the ultimate judge and therefore it is the only one who can engage the critical task of establishing reason's standards of correctness[11] unfortunately looks circular, and violates the basic legal principle that one should not judge one's own case (*nemo judex in causa sua*).

Thus, we may want to explore an *externalistic foundation*. From this perspective, reasoning schemata are rational when they enable us (better than other possible reasoning schemata, given out biological constitution and the nature

[11] "It is a call to reason to undertake anew the most difficult of all its tasks, namely, that of self-knowledge, and to institute a tribunal which will assure to reason its lawful claims, and dismiss all groundless pretensions, not by despotic decrees, but in accordance with its own eternal and unalterable laws" (Kant 1999, Axi–xii).

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