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Author E.J. Andrade-Lotero
Faculty FNWI: Institute for Logic, Language and Computation (ILLC)
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Chapter 4

Towards a practice-based account of information

4.1 The plan for an alternative semantics

4.1.1 Why practices?

I contend that semantics, conceived as the study of literal meaning and semantic competence—i.e., the abilities that underly linguistic production and understanding—has to be informed by a theory of practices. But what has a theory of practices got to do with literal meaning and semantic competence? The formal semanticist does not see the relevance of a theory of practices in semantics. Moreover, although the formal pragmatist may take account of a theory of practices for his or her own pragmatic theory, this theory is already informed by a semantic theory, which in turn is conceived to be prior and independent from a theory of practices. Thus, neither formal semanticist nor formal pragmatist attribute relevance to a theory of practices as far as semantics is concerned. As opposed to this, I contend that a theory of practices makes essential part of a semantic theory.

One of the fundamental semantic relations, according to the formal semanticist, is the one between sentences and facts (or states of affairs). Not only is this relation conceived to be derivative from the more fundamental relation of reference, but the facts (or states of affairs) above-mentioned are conceived to be independent from language-use and, in a more fundamental sense, independent from human culture. As opposed to this, I contend that neither is the referential relation fundamental, nor are all facts (or states of affairs) to which language refers independent from language-use and human culture.[1]

[1]To put it another way, we can make a comparison between, on the one hand, the relation between world, facts, and language in Wittgenstein's *Tractatus* and, on the other hand, the account I propound here. In the *Tractatus*, the world is defined as the totality of facts. Hence, what the world is depends on a prior definition of what facts are. And these facts and the

Our discussion of symbolic kinds—i.e., the concepts the extensions of which depend on the proper use of signs that express those concepts (see §2.1.1)—shows that there are parcels of our 'human world' that are not independent from our uses of signs. For instance, that a beer costs 3 Euros in a particular store is a fact about our 'human world' that is not independent from the use of signs that express the fact that such beer costs 3 Euros. In particular, if we want to explain linguistic information, we have to account for the information carried by words such as "yellow card," "entrance ticket," "passport," "citizen," "university student," "admission," "approbation," etc., all of which express symbolic kinds.

Symbolic kinds partly constitute our 'human world'. Regardless the non-physical nature of the sort of objects belonging to such kind of concepts, the fact remains that we understand and talk about them; we do not go about our everyday life wondering about their reality; they are out there and have an influence on our actions, while at the same time they are partly constituted by our actions. The most fruitful way to account for such objects, in my view, is to start out from the idea that our inquiry need not meet reductionist scrupulous.

Contrary to mainstream theories of language, I believe that the question as to how to reconcile the information carried by language, which deals with non-physical 'objects', with the world as described by the natural sciences is a vexed one. That is, if such reconciliation is motivated by explanatory reductionism—i.e., the thesis according to which "all genuine explanations must be couched in the terms of physics, and that other explanations, while pragmatically useful, can or should be discarded as knowledge develops" (Stoljar, 2009).[2] I believe that no illuminating answer about the information carried by language can come from this reductive reconciliation.[3] For the study of the information carried by language is not in the business of making claims as to what are the constituents of the world as described by the natural sciences. The 'objects' presupposed by our language

logical relations between them are already there, layed down in advance of language-use. In the *Tractatus*, moreover, the fundamental semantic relation is that of reference between simple names and simple objects (and their agreement in logical forms), which underwrite a picturing relation between sentences and facts. As opposed to this, I contend that the world contains an open-ended collection of practices. Hence, an account of what the world is—i.e., our 'human world', which is the locus of language—requires, *inter alia*, a prior definition of what practices are. I also contend that one of the fundamental semantic concepts is that of the roles of words in practices. Note that if many words acquire their meaningfulness in virtue of the roles they play in practices—i.e., language-use—, then language is not independent from practices and practices are not independent from language-use.

[2]Hence, I disagree from the start with Searle's philosophical motivations to studying our social world; for he starts from the 'fundamental question in contemporary philosophy', namely "How, if at all, can we reconcile a certain conception of the world as described by physics, chemistry, and the other basic sciences with what we know, or think we know, about ourselves as human beings?" (Searle, 2010, p. 3)

[3]I believe that there is no definite answer as to what shape a non-reductionist account of these objects must take, but there seem to be clear constraints on the conditions of adequacy of these accounts (see §2.1.2).

deserve to be explained in their own terms, that is, they need not be reduced to atoms, sense data, stimulus, responses, neural activity, or what have you. We can see that the ontology presupposed by our language and metaphysics (in the broad sense) are different on the basis of the following consideration. Even if someone claims that everything ultimately supervenes on the physical, her argument for this very claim can appeal to theories, logic, common-sense, beliefs, etc., and thus her argument, and *a fortiori* the language in which it is framed, presuppose 'objects' that do not belong to the metaphysics that she tries to defend.[4]

Now, the gist of an account of symbolic kinds resides in the notion of use. There are several situations and properties that any theoretical account of use has to explain and preserve. To begin with, as stated by our criteria of adequacy (see §2.1.2), such theoretical account should preserve our descriptions of our uses of language in everyday life. Furthermore, the notion of use requires to explain that our activities are governed by rules, precepts, principles, and legislations. By means of example, suppose that a foreigner requires to ask for a work permit from the Immigration Office of the country that he lives in. In order to accomplish this, he needs to fill out some forms, some of which express or are related to the concept [to be granted a work permit of country X]. He also needs to hand in these forms, some other documents, and pay a fee. Now, doing all this is part of using signs and expressions that express or are related to the concept [to be granted a work permit of country X]. These signs and expressions, moreover, will be used also by the staff at the Immigration Office either to grant or deny a work permit to this person—and hence the extension of such concept depends on such doings and sayings. All these doings and sayings on the part of the staff are governed by rules and legislations. *A fortiori*, the foreigner's doings and sayings, as far as asking for a work permit are concerned, are also governed by these rules and legislations. Furthermore, and to the extent that a concept determines its extension, the concept [to be granted a work permit of country X], since it depends on the doings and sayings of the staff at the Immigration Office, is also governed by rules and legislations. Hence, the account of the 'use' of signs and expressions that express the concept [to be granted a work permit of country X] requires to take into account how the participant's actions are governed by rules and legislations.

Moreover, the notion of use has to account for the observation (see §2.2.2) that our abilities to use language are more of embodied ones, rather than rule-based and implementation-free programs. And such a notion of use should also account for the fact that we can successfully communicate despite incomplete understanding of the expressions used. This point deserves a closer scrutiny.

[4]This is not a paradox, but an argument to the effect of showing that metaphysics and natural language metaphysics are different. Such a difference can also be maintained regardless the fact that each natural language metaphysics requires a particular metaphysics. However, while the question as to the metaphysics cannot be avoided, the point still remains that such question need not arise at the stage of an account of natural language metaphysics.

Suppose a child enters a butchery to buy a particular meat-cut, say beef chuck short ribs, that his mother wants to prepare for supper. The child has been given twenty euros and has been instructed to buy as much of this meat-cut as this money affords. The child asks the butcher "How much a kilo of beef chuck short ribs?" (he has learned by heart the name of the meat-cut, but he really does not know what it is). The butcher says "Six euros;" The child answers: "Three and one third kilos, please." Let us start out by focusing on the concept [beef chuck short ribs]. It must appear as fairly uncontroversial that the extension of such concept depends on our actions on physical entities. For although the meat itself was inside the cow, the concept does not refer to a particular part of the cow, but to the meat already butchered and kept separated from the rest of the meat—no-one uses the expression "beef chuck short ribs" to refer to a not detached part of a cow. Furthermore, the words "beef chuck short ribs" on the child's mouth carry an information that depends on our activities on physical entities, regardless of the fact that the child cannot be said to completely understand this expression. Moreover, as discussed in §2.1.2, our ability to use mathematical signs depends on the representation of numbers that was chosen, which strongly suggests that the ability to use those signs is more of an embodied capacity to manipulate signs in particular ways, rather than an implementation-free algorithm. An account of the notion of use should explain these points.

I propound that, to achieve these desiderata, the word "use" should give its way to the expression "role in a practice." Thus, we will look for a theory of practices that allows us to provide a description of the roles that words, expressions, gestures, and symbols (*signs*) play in practices. For many sings used in our everyday life, though not all of them, carry information in virtue of these roles—we shall refer to this kind of information as *practice-based information*. We must emphasize that, while it is maintained here that such a notion of information permeates language, we need not commit to the idea that this is the only way in which signs can carry information.

I will avoid here the discussion whether the roles that signs play in practices can be properly called semantic ones, because this discussion will inevitably degenerate in a problem of definitions. For instance, a formal semanticist would be reluctant to call these roles semantic ones inasmuch as they are not based on a relation between words and referents. But, clearly, his/her claim depends on the previous acceptance of a conception of semantics as the study of relations between words and referents (and, the formal semanticist would add, their rules of composition).

However, we can adduce two reasons to support the idea that these roles are indeed semantic. First, the roles that sings play in practices underwrite the speaker's 'semantic competence', for they explain the speaker's ability to comprehend and produce words and expressions (see §4.1.3). If some of these roles do not require a prior referential relation between signs and referents, so much the worse for the primacy of the referential relation in semantics. Second,

conceiving of these roles as the information carried by many signs makes room for an analysis of the above-mentioned desiderata, as I shall try to argue for in this chapter.

Thus, I believe that a semantic theory can profitably make use of the following elements: (i) a theory of practices; (ii) an account of the role that words and expressions play in practices; (iii) an account of how these roles underwrite the speaker's ability to comprehend and produce words; and (iv) an account of literal meanings.

4.1.2 Practices and information

A theory of practices

The present discussion of practices and understanding is based on Schatzki's *Social Practices* (1996, chapter 4) and *The site of the social* (2002, chapter 2).

To begin with, Schatzki makes an important clarification as to what a practice is *not*. The important target of analysis for him, as well as for our present purposes, is not that of a practice as doing something repeatedly (e.g., when one is practicing the piano), nor is it that of practice as opposed to theory. The notion of a practice that Schatzki, and us, are interested in is a "temporally unfolding and spatially dispersed nexus of doings and sayings" (Schatzki, 1996, p. 89).

Besides doings and sayings, I shall add to the components of a "temporal unfolding and spatially dispersed nexus" both the inputs and outputs of practices. That is, the notion of a practice becomes that of a temporal unfolding and spatially dispersed nexus of doings, sayings, inputs and outputs.[5]

My motivation for this addition is the following. Although inputs and outputs make part (in an implicit way) of Schatzki's analysis, I want to bring them to the fore to make justice to a distinction that played a crucial role in my discussion of incomplete understanding in the previous chapter. I have argued that it is possible to recognize or comprehend the product of a process without being able to recognize, comprehend, or produce the process that brings about this product. For instance, one can understand the measure of the distance between Earth and a distant star, without being able to understand or carry out the process to find out such a measure; or one can recognize a cappuccino without recognizing or being able to carry out the process of preparing a cappuccino. This distinction underwrites my discussion of incomplete understanding and the concomitant socially shaped aspect of purposes.

It is worth noting that it is assumed here that the output of one practice can be the input of another. Furthermore, both inputs and outputs can be physical—e.g., the wood and nails that are used to create a chair—, or symbolic—e.g., the

[5] I believe that we should also add the tools that people use in their practices. However, for the sake of simplicity, and since nothing substantial for present purposes seems to hinge on it, I will leave them out from the present account of practices.

function x^2 as an input for the practice of finding the derivative of a function, and $2x$ as the output of this practice. I sometimes call physical inputs "materials," and physical outputs "crafts."

Doings and sayings, according to Schatzki, are "linked" by an *organization*, which consists of (A) practical understandings; (B) rules; and (C) a teleoaffective structure.[6] I will extend this organization to link not only doings and sayings, but also inputs and outputs.

Different practices have different organizations. Moreover, that a component of a practice's organization "links" doings, sayings, inputs, and outputs means that any given number of doings, sayings, inputs, or outputs belong to the nexus that composes the practice if the component 'deals' with them. This point will become clearer with the description of the components of a practice's organization.

The practical understanding that belongs to the organization of a practice p—i.e., (A) above—can be decomposed in a number of abilities. The abilities of a practical understanding are the following (adapted from Schatzki, 1996, p. 91):

(i) to be able to *recognize* a fair amount[7] of *doings and sayings* as instances of the practice p—e.g., by expressing normative reactions such as assenting when the performance is good, or disgust when it is not.

(ii) to be able to *recognize* a fair amount of *inputs and outputs* of practice p—e.g., the shower as the place where to take showers or to recognize a hot beverage as a cappuccino;

(iii) to be able to *carry out* doings and sayings that are instances of p;

(iv) to be able to *prompt* instances of the practice p—e.g., prompting the bartender's practice of serving beers by showing him or her with a gesture of the hand how many beers one wants;

(v) to be able to *respond* to instances of the practice p—e.g., to respond to the practice of ordering beers;

As far as the abilities of particular individuals that participate in practices are concerned, it seems relevant to make a distinction between the abilities that can be

[6]In *The site of the social*, Schatzki adds to a practice's organization a fourth component, namely, general understanding. This concept refers to the "sense of common enterprise" or the qualitative evaluation that participants endorse by being aware of their participation in a certain practice. For instance, the sense that they are carrying out God's will, or that they must do what they do to defend democracy, etc. Though important as this component may be, for the sake of simplicity, and since nothing substantial for present purposes seems to hinge on it, I will leave it out from the present account of practices.

[7]The expression "a fair amount" may be misleading, for it suggests that it could be possible to quantify the proportion of correct acts of recognition that an able person should be in a position to carry out. However, I do not think that it is necessary, or even possible, to obtain such a quantification. I just use this expression for lack of a better one. The same goes for item (ii).

classified as comprehension, the abilities that can be classified as production, and the abilities that can be classified as both. For instance, the abilities to recognize a practice's doings, sayings, as well as its inputs and outputs, clearly fall within the comprehension category. To carry out a practice's doings and sayings clearly falls within the production category. These categories do not seem altogether independent from one another. For the abilities to respond to, and prompt, instances of a practice seem to belong to both categories of comprehension and production (e.g., in order to be able to prompt instances of a practice, one must be able to recognize, to some extent, this practice's inputs, outputs, and/or doings; the same is even clearer in the case of responding to a practice's instances).

One can be familiar with some practices by possessing comprehension abilities while at the same time only possessing underdeveloped production abilities. For instance, one does not need to possess abilities to play football in order to possess abilities to comprehend it (this practice includes not only the players' actions and roles, but also the signs used in the game—e.g., the court's divisions, the uniforms, the referee's cards, the flags, etc.). The same can be said of practices such as tennis, chess, dancing, etc. There are other practices the familiarity of which seems also to require production abilities. For instance, one can not recognize when someone is reading, and not merely pretending to read, if one can not read. Something similar can be said about the practice of finding out the derivative of a function, to exchange money, etc.[8]

Note that it is also possible to be able to recognize inputs and/or outputs of a practice but be able to a very limited extent to recognize carrying outs of the practices that bring about these inputs and outputs. The case of measuring how far away from Earth a star is has been already mentioned. Other examples are the recognition of a croissant without recognizing when someone is preparing one; or the recognition of a paper-made pigeon without recognizing someone's actions on a piece of paper that create it; etc.

Links between doings, sayings, inputs, and outputs are sometimes tied to explicit rules, principles, precepts, or instructions—i.e., (B) above. "This means that people take account of and adhere to these formulations when participating in the practice" (p. 100).[9]

[8]Just as there are practices the familiarity of which can consist, for the most part, of abilities of "comprehension," or of mixed abilities of "comprehension" and "production," there is room, at least conceptually, for there being practices the familiarity of which can consist, for the most part, of abilities falling into the "production" category. For instance, an American football player that plays defense can be fairly familiar with his practices only by carrying them out, and by responding fairly well to attacking practices, without being himself able to recognize or prompt the kind of defensive practices he can carry out. Or the pupil of a mythical martial art can be trained by being told to do this-and-that without ever seeing his master, or more advanced pupils, at work carrying out movements in order to imitate them. Whether "comprehension" always precedes "production" shall remain as a topic for further investigation.

[9]In the context of a theory of practices that underwrites a semantic theory, component (B) might strike as a threat of circularity. However, rather than circularity, this component brings to

The doings, sayings, inputs, and outputs of some practices are associated with a hierarchical order of purposes and projects, and with a range of emotions. These hierarchies need not be, although they could be, explicitly stated in linguistic or symbolic formulations. This is what Schatzki calls a teleoaffective structure—i.e., (C) above. For instance, a practice, say cooking, requires a hierarchy of purposes—e.g., chopping the vegetables, preparing the dressing, preparing the salad, etc.—and a concomitant hierarchy of projects—e.g., measuring the amounts of vinegar, honey, and olive oil in such and such a way, mixing the vinegar, the honey and the olive oil in such and such a way, etc. Some but not every practice includes a range of emotions. Practices that include a range of emotions are, e.g., rituals, comforting, cheering up, flirting, etc. On the other hand, cooking, chopping, writing, etc., do not include a range of emotions.

Schatzki defines *Integrative practices* as those practices the organizations of which include (A)–(C). The organization of *Disperse practices*, on the other hand, only include (A). This is Schatzki's terminology, but for our purposes we might well allow for a continuum of organizations that contain, in varying degrees, the elements belonging to (A)–(C). Among this continuum, there will be the two categories defined by Schatzki.

An aspect that I deem essential to the present account of practices is the asymmetric character of the members of a community with regards their practices, as well as the asymmetric character of the participants of a given practice (Schatzki, 1996, p. 93). The former asymmetry separates, among the members of a community, experts from laymen; the latter asymmetry separates, among the participants of a given practice, experts from novices.

The terms 'expert,' 'novice,' and 'layman' shall be used here to describe different relationships with practices, despite the fact that it seems somewhat awkward to use these labels with some practices—e.g., to be a layman in the practice of greeting people. The different relationships with practices can be characterized not only in terms of familiarity, but also in terms of capabilities. I am not only unfamiliar with Olympic gymnastics, but I am incapable of practicing it. And I am very well capable of driving a bus, but I am not familiar with it. Moreover, I am familiar with football but I am capable of practicing it only to a very limited degree. Thus, given a practice p, an 'expert' in p has a very close relationship with p in terms of capabilities and familiarity; a 'novice' has a certain extent of relationship with p, e.g., by being capable of carrying out p but not being so familiar with it; and a 'layman' has a distant relationship with p, e.g., by being poorly familiar with p and perhaps by not being capable of carrying out p.

The novice's process of learning or internalizing a practice can be analyzed into the processes of learning or internalizing each component of the practice's

the fore the holistic character of the kind of explanation of language and practices propounded here. For the way explicit rules, principles, instructions, etc., organize practices can be further explicated by the kind of semantic theory that I recommend here, especially by the roles of literal meanings that we will discuss later on.

organization. In the case of an integrative practice, for instance, it is likely that the novice learns or internalizes aspects of the teleoaffective structure and some of the rules of the practice in a first step, and then starts to gain some of the understanding that constitutes component A of the practice's organization. Note that the possibility of incomplete understanding, which underwrites the possibility of having incompletely understood purposes and to use incompletely understood expressions, plays an important role in the first step of the novice's learning or internalization. The familiarity gained with component A will allow the novice to learn or internalize more and more of the teleoaffective structure and to attribute significance to the rules or precepts that she learned or internalized in a previous step. This process can be seen as a back and forth process where familiarity with one of the components of the practice's organization allows for further familiarity with another of these components. The case of learning or internalizing disperse practices is more of a matter of shaping a person's know-how.[10]

The roles of signs

With a theory of practices at our disposal we can delve into a characterization of the roles that signs might play in practices (note that I am not claiming that this is the only way in which signs can be meaningful). To this effect, we can analyze each component in a practice's organization to determine what roles signs can play.

Starting with component A, the first role that we can pin down is that of using a sign for the *attribution of p-ings*. That is, if the speaker recognizes that someone is carrying out practice p, she can assert, perhaps accompanied by an ostensive gesture, "she is w*ing*!" (by analogy with the case when someone calls a rock "rock!"). For instance, when Mary asks Paul "Where is John?" and Paul says "He is fixing his bike."

A sign can also be used to *refer to p-crafts* (that is, outputs of a practice). For instance, to refer to raincoats, cappuccinos, boats, etc.

A sign can play the role of being the *output* of a practice. For instance, words and expressions are the outputs of the practice of describing, asking, reciting, etc. Symbols are the outputs of counting, measuring, solving an equation, etc.

A sign can also be used to *refer to the material inputs* of, or the tools used in, a practice—e.g., showers, nails, hammers, etc.

Another role is that of using a sign as part of *carrying out* a practice. For instance, when some children are playing "You are 'it' " and one child touches another and claims "You are 'it'!". Or when the referee shows a player who misbehaved in a soccer game a yellow card. Or when a Ministry of Foreign Affairs issues a visa to someone so that he or she be allowed to legally work in a country.

[10] A detailed description of both kinds of learning or internalization is beyond the scope of the present dissertation, and shall remain as a topic for further investigation.

A sign can play the role of being the *input to, or the way to prompt, a p-ing.* For instance, if someone holds one finger in high in front of a bar tender, this could be the input for the bar tender to give him (or her) a tap beer. Or the name of a meat cut and a particular weight could be the input for the butcher's practice of cutting and selling this amount of this particular meat cut.

A sign can be the way of *responding to a p-ing.* For instance, the bar tender's nodding in sign of recognition of someone's holding one finger in high asking for a beer. Or the current time when someone asks you the time.

Now, with regard to component B of a practice's organization, a sign can play the role of being part of a rule or precept. An extension of this role is for a word or expression to be part of a theoretical body of knowledge. For instance, by being part of a definition of another expression, by being a shorthand for a bigger expression, or by playing a particular role in a theory, such as the expression "transfinite cardinal," which plays a particular role in (formal or informal) set theory.

As for component C, some words play a role in prompting certain emotions when they are accompanied by certain gestures and/or moods. For instance, the expressions "Cheer up!" or "Hi, good looking" are used to prompt particular emotions. Signs can also be used to stand for goals (e.g., a theorem to be proved, 3D images of a building to be built, etc.) and projects (e.g., a flowchart, a to-do-list, etc.).

A practice-based account of information

With this account of the roles of signs at hand, I suggest that these roles constitute the information that many signs in our language carry. Note that this information is relative to the practice of which the role is a part. We can make this point clearer by means of an analogy with Turing machines.

The role a sign plays in a practice can be conceived in analogy with the execution of a Turing machine that is determined by a given sequence of 0s and 1s and a particular program (given that the machine is in the initial state S_0).[11]

[11]"A Turing machine is a kind of state machine. At any time the machine is in any one of a finite number of states. Instructions for a Turing machine consist in specified conditions under which the machine will transition between one state and another. A Turing machine has an infinite one-dimensional tape divided into cells. Traditionally we think of the tape as being horizontal with the cells arranged in a left-right orientation. The tape has one end, at the left say, and stretches infinitely far to the right. Each cell is able to contain one symbol, either '0' or '1'. The machine has a read-write head, which at any time scanning a single cell on the tape. This read-write head can move left and right along the tape to scan successive cells. The action of a Turing machine is determined completely by (1) the current state of the machine (2) the symbol in the cell currently being scanned by the head and (3) a table of transition rules, which serve as the 'program' for the machine" (Barker-Plummer, 2009).

The sign corresponds to the sequence of 0s and 1s that are introduced in the machine's tape, the practice corresponds to the program, and the role played by the sign corresponds to the execution of the program on the sequence of 0s and 1s. The information carried by a particular sequence of 0s and 1s consists in that a given program, working on this input, will produce a particular behavior of the head of the Turing machine, which in turn will produce a particular output on the tape.

A particular sequence of 0s and 1s is, hence, meaningless on its own, and is only meaningful against the background of a particular program of which the sequence is an input. Moreover, the sequence may carry different informations relative to different programs. By analogy, a sign is meaningless on its own, and is only meaningful against the background of a particular practice in which the sign plays a role. The sign can carry different informations relative to different practices.

Sequences of 0s and 1s can also be the outputs of the execution of a given program of a Turing machine. Likewise, signs can be the output of practices. Physical objects can also be inputs and outputs of practices, and hence they also play a role in practices. This means that physical objects—i.e., materials and crafts—also carry information in the way that I have propounded here.

The analogy breaks down in the following points. Whereas a Turing machine requires only the action of a single head over a single tape,[12] which seems to invite the analogy between Turing machines and minds, there are a good deal of practices that essentially require at least the participation of two persons, e.g., selling or buying. In particular, I am not claiming that signs are bestowed meaning by the act of a single mind. In view of my discussion of incomplete understanding, it becomes clear that the information carried by a sign depends on the interaction between several participants.

Furthermore, a Turing machine abstracts away from changes in the machine itself. But practices are in constant change due to changes in the participants, or by an intrinsic change in one or several of the participants, or by a change in the materials that are the input of the practice, or by a change in what the output of the practice should be.

Another point where the analogy breaks down is that a Turing machine does not seem suitable to give a proper account of those roles that essentially depend on purposes and emotions. This limitation requires an argument, but it is beyond the scope of the present dissertation to delve into this particular point and shall remain as a topic for further investigation.

[12]The computational power of machines with multiple heads and multiple tapes is exactly the same as a machine with only one head and one tape.

4.1.3 Language intelligibility

Intelligibility

The speaker's ability to comprehend and produce words can be explained, in my view, in terms of what I shall call "language intelligibility." According to Schatzki, intelligibility is "making sense." There are two dimensions of intelligibility: world intelligibility and action intelligibility; "how the world makes sense and which actions make sense" (Schatzki, 1996, p. 111). Schatzki does not define explicitly, however, a notion of language intelligibility. I contend that language intelligibility can be analyzed in terms of both world intelligibility and action intelligibility; language is a complex notion of which both objects (spoken or written words and expressions, mathematical symbols, traffic signs, etc.) and actions (speech acts) make part.

World intelligibility concerns how objects are understood to be. Such an "understanding to be" is an ability possessed by a person, and is expressed in both her sayings and doings as regards the object. For instance, a person's understanding of an object o, say a tree, "is expressed in her calling it a tree, what she says about it, and how she acts toward it (e.g., climbs it, feels it, or admires its foliage)" (Schatzki, 1996, p. 111). Note that objects can be categorized in virtue of their being expressed by similar doings and sayings.

Though the expression of an "understanding to be" is important, the phenomenological experience thereof is just as important. Not only because often people do not express their "understanding to be" as regards familiar objects, but because such expression co-depends with such experiences. For instance, how one experiences a given pen, say by perceiving it and handling it depends on how one has been taught to use other pens; and how one uses now such pen depends on how one experiences it—too thin, too heavy. Moreover, the acquisition of this "understanding to be" depends on the person's being exposed to speech acts, as well as her observing or carrying out activities with, or on, the kind of objects that belong to this "understanding to be." "Understanding is expressed and acquired in a tightly interwoven nexus of doings and sayings in which neither the doings nor the sayings have priority" (*Idem*).

Sayings and doings are usually part of a nexus that belongs to one or several practices. The "understanding to be" is relative to some practices because it partially overlap with the practical understanding of those practices. This is what it means that "[h]ow things make sense is articulated primarily within social practices, for it is within practices that what things are understood to be is established" (*Idem*).

A particular case of world intelligibility is when the objects that are made sense of are spoken or written words, conceived in abstraction of the speech act that brings them about (e.g., when one is reading a book or a sign on the road). The intelligibility of these linguistic objects is expressed and experienced in relation to

a nexus of sayings and doings that belong to some practice, which partly define the role that these objects play in the situation in which these signs are perceived.

As for action intelligibility, this notion refers to what actions make sense to a person to do in a particular situation. "Although people are always able and prepared to do a variety of things, at a given moment they invariably carry out those actions that are signified to them as the ones to perform" (*Ibid.*, p. 118). Schatzki identifies two dimensions to what is signified to do. Under the first dimension—i.e., the teleological component—there are the purposes and projects that a person entertains in a given situation. And under the second dimension—i.e., the affective component—there are the emotions, moods, feelings, and affects that a person entertains in a given situation.

Actions are made sense of against the background of the integrative practices the teleoaffective structure of which partly contains the two dimensions of what is signified to do. The "partly" is important given that in a particular situation the two dimensions of what is signified to a person to do need not completely fit the teleoaffective structure of any practice that this person (or the interpreter of this person's action) is familiar with. For instance, a person may pick up the phone to order a pizza in order to give a treat to his girlfriend. Thus, the purposes and projects of the practice of ordering a pizza only partially fit what is signified to this person to do, and the same goes for the purposes and projects of the practice of giving a treat.

A particular case of action intelligibility is when the action is a speech act. The identity of the speech act shall be analyzed here in terms of the words used and the situation in which the speech act is performed—i.e., the situation of use. But before we delve into the characteristics of a situation of use, it is worth noting that action intelligibility, in the case of a speech act but also in many other cases, depends on world intelligibility. That is, to make sense of someone's speech acts one depends on, among other things, how one makes sense of the words that she uses.

Situations of use

No use of a sign is carried out in the vacuum; it always occurs in a *situation of use*. Before I lay down the elements of a situation of use, I want to introduce this concept by means of an example.

My wife and I want to buy a sofa. The sofa has to fit in the living room, so we have decided that the sofa needs to be no longer than 1,65m. Now, suppose I am playing chess at my brother's and my wife calls me and tells me "I found it, it is brown and is only 1,50m." I take it that I do not understand what my wife told me unless I let her know that I get it that she is talking about the sofa that we were looking for, that I need to give her my opinion on the matter, and that we need to reach an agreement. The agreement might be that I am busy at the moment and that it would be better to discuss the issue later on, or that I

trust her judgment on color and length, but that I want to know the price before making any decision (so that she needs to let me know the price of the sofa), or that I will head for the store where she is calling me from, or something along these lines.

That the sentence "I found it, it is brown and is only 1,50m" is highly context dependent goes without saying. The 'features' of the situation that are required to understand this sentence are the following: (a) that the situation includes my wife and me; (b) that we share a vocabulary that includes the words used in that sentence, and also words such as "sofa", the numerals, some colors, "look for," "tell me," "not now," etc.; (c) that we have an immediate purpose, namely to find a sofa for our apartment; (d) that uttering sentences is not an end in itself, that is, that we take our utterances to have an effect on the other person in order to reach (extra linguistic) purposes; (e) that I can not consider myself to understand, nor will my wife take me to have understood,what she told me unless I try to find an agreement with respect to our purpose—even if it consists in suspension of the achievement of this purpose to a later moment; and (f) that if something goes wrong in this exchange, we will show each other what we expect from each other in a future opportunity.

Going to a higher degree of generality, we can describe the previous features of a situation of use in the following way (adapted from Stein, 1997, p. 136):

(a) the participants of the exchange;

(b) the words potentially used and understood by the participants;

(c) some (extra linguistic) practices;

(d) a place of language in these practices—i.e., the role of words and expressions in these practices;

(e) a description of various standards of success in relation to various (short and long term) purposes;

(f) an indication of various ways in which the members of the community can train themselves into using their language (according to their various purposes), if the exchange is not successful.

On the basis of this six-fold structure of a situation of use we can define a *type of situations of use* by fixing five or less constituents and varying over the remaining one(s). For instance, given a situation of use that consists of two participants, we can obtain a type of situations of use by varying over the participants and keeping (largely constant) the remaining five constituents.

Finally, it is worth noting that since communication always occurs in a situation of use, the purpose of the exchange is always tied to this situation, and so is the experience of each of the participants. Note that the situation of use makes sense (for each of the participants) against the background of some practices. In most everyday situations, it is by reference to them that many of the

words used in the exchange carry information. Hence, changing the practices that occur at the background of the situation entails changing the information that these words carry in this situation. Furthermore, each situation of use comes with its own teleoaffective structure, depending on the teleological and affective dimensions that each participant is in.

Understanding

Understanding shall be conceived here as the ability to act (or react) to address the two dimensions of the teleological structure of a situation of use—i.e., to carry out projects and achieve purposes, as well as to address the emotions and affections of the situation. This ability, in virtue of its internal relation to purposes and practices, is inherently social and tied to types of situations.

As for the inherently social aspect of understanding, we can introduce it in terms of the example of the cappuccino, presented in the previous chapter. The short version is that B, although not familiar with cappuccinos, is able to get A a cappuccino by asking C, a coffee shop waiter, "a cappuccino, please?".[13] One interesting part of the story is that although B has been attributed the purpose of getting A the product of p, i.e., a cappuccino, B is not familiar with it or with the practice that produces it.

In this example, A, B, and C understand the expression "w" to different extents. As far as the example is concerned, all A, B, and C acted and reacted satisfactorily to the expression "w" to achieve their purposes. But their varying degrees of understanding depend on the extent to which their abilities are enough to achieve purposes, as far as "w" and practice p are concerned, in different situations.

For instance, B can successfully get someone the product referred to by "w" provided that there is someone else that can prepare it for her, and this is the extent to which B's abilities allow her to achieve purposes as far as "w" and practice p are concerned. Note that this ability on B's part essentially depends on there being someone else, namely C, that participates in the achievement of the purpose. Hence, B's ability, and therefore B's understanding, is socially shaped.

[13]The long version is the following. Suppose that "w" is an expression that refers to a practice p. Say p is the practice of preparing a cappuccino. Suppose that A craves for the craft that is obtained from carrying out p, that is, a cappuccino, but suppose also that she is familiar with p only to a limited extent because she is only familiar with p-crafts. Furthermore, suppose that B is not familiar with p at all because she is not able to carry out p nor is she able to recognize p-crafts. Moreover, suppose that A and B live in a society where there are people like C, who are (completely) familiar with practice p. Now, in order for A to achieve her purpose of obtaining a p-craft, she can use the expression "w" in order to prompt the practice of getting a p-craft from someone, in this case B. Since we can assume that B has given herself the duty of taking care of A, but she does not know what a "w" is, B goes to C and asks "w." C recognizes this as the input to the practice of selling the product of p and promptly sells a cappuccino to B. That is, in order for A to enjoy a cappuccino, she can ask B for a cappuccino, who in turn can buy one from C.

If we go beyond this type of situations, by considering other types of situations and by taking into account the dissimilar familiarities of A, B, and C with respect to p, we will see that A understands "w" better than B does, and that C understands "w" better than A does. For, according to the previous conception of understanding, there are (or could be) many situations where A could not achieve her purposes, and there could be even more situations in which B could not achieve her purposes, as far as the roles of "w," and practice p, are concerned.

Another way to put this is the following. Understanding is an ability that depends on types of situations of use. Let $[\![X]\!]_{w,p}$ be the set of situations of use where an expression "w" plays a role in practice p and where X can successfully achieve purposes and/or address the range of emotions of these situations by using "w." For instance, $[\![B]\!]_{\text{“}cappuccino\text{”},p}$, where p is the practice of preparing a cappuccino, is the set of situations in which B can give someone a cappuccino by using the expression "cappuccino." With this notation at our disposal, we can relate A's, B's, and C's understanding, as far as the previous example is concerned, in the following way: $[\![B]\!]_{\text{“}cappuccino\text{”},p} \subseteq [\![A]\!]_{\text{“}cappuccino\text{”},p} \subseteq [\![C]\!]_{\text{“}cappuccino\text{”},p}$.

Types of structures of phenomenological experiences

We go about our day-to-day life most of the time in a low-level of attention, more or less predicting the outcomes of our, and many other people's, actions. When we participate in successful linguistic exchanges we do not pay attention to the words but to the themes they deal with. We experience such themes as determinate objects, and we set standards of success for our exchange in an unreflective fashion. In all the situations that constitute this recurrent day-to-day life, we are in a constant experience of success, till something goes wrong.

When something goes wrong in our activities (e.g., we do not obtain the desired result, we fail to anticipate someone's actions when we expect to be able to do it, our instruments break, our interlocutor is hesitating too much, etc.) we start paying attention to the situation. We dissect it into (relevant) components to try and find and fix the source of the failure. But before we reach a state of full reflection, we experience a number of things. We become aware that we are in a particular situation, and we sometimes start to feel tension or discontent. We feel that the situation, although familiar in many ways, does not look familiar in many other respects. In the case of failure of a linguistic exchange, we start paying attention to the words. We experience that the theme of the exchange is becoming problematic because, for instance, it may not seem as something determinate, or we may feel that we are not sure which is the theme of the exchange (among several ones).

I assume that there are three relevant structures of phenomenological experiences: success, failure, and reflexion. It is worth noting that there could be experiences of success, failure, and reflection as regards many situations. How-

ever, we focus here on the kind of experiences that have to do with the use of words or expressions in particular situations. That is to say, the terms "experience of success," "experience of failure," and "experience of reflection" have restricted uses from now on.

In a general fashion, the structures of experiences of success and failure can be characterized as follows:

Experience of success
Unreflective
Familiarity
Assumption of determinateness
Sense of success
(Images, certainty, ...)

Experience of failure
'Pre-reflective'
Familiarity is in conflict
Assumption of determinateness is in conflict
Sense of failure
(Discontent, tension, ...)

(Note that I assume that the experience of failure is always preceded by an experience of success.)

Whether a person has these experiences is in part due to his/her particular familiarity with the practices in which the expression in question plays a role. That is, a layman, a novice, and an expert have different experiences due to their varying degrees of familiarity with the practices they are involved in. For instance, where a novice with respect to the practice of tailoring may not notice the inadequacies of his/her traces and cuts—and thus not (yet) experience a failure—an expert is tuned and sensitive to traces, cuts, and their outcome in such a way that he/she can easily note inadequacies in his/her, or someone else's, performance.[14]

Let us now turn to a brief description of the experiences of reflection by means of an example. In the example of the cappuccino, the exchange between A and B, that is, A's addressing "a cappuccino (please)" to B, could go wrong since B might well not know how to achieve her purpose of getting A a "cappuccino." For instance, she might not know where she can go to buy whatever A is asking for. This might be evident in B's expression of discontent and (mild) tension. So both A and B might become aware that the exchange is not successful and have an experience of failure. The situation may continue when A says to B, "This is a cappuccino" and shows to her one picture of a cappuccino. Or she might say, "A cappuccino is a kind of coffee." Both A and B experience this exchange in a reflective way, although A will take a leader stance, whereas B will take a follower stance. They will both have an attitude of 'going back to the basics'—i.e., that there is something they should take for granted, and that this something is just how things are—, and an attitude of 'ought'—i.e., that this is how things should be, not only now, but in a way that goes beyond this particular situation.

[14]This point is illustrated in detail in Ritveld's (2008) discussion of normative discontent. The relations between normative discontent and the present account of experience of failure, as well as the way in which the present account can be enriched by Rietveld's (2009) account of unreflective action shall remain as a topic for further investigation.

A is familiar with a practice's craft, namely, cappuccinos, so she feels confident that she knows the criteria of success of how to handle this kind of situations (of referring to cappuccinos). B is not familiar with it, but she trusts that A has a better idea, and seeks to understand what this idea might be. This idea, finally, is experienced as something determinate; *this* idea is what B is seeking and what A knows.

Note that I assume that the structure of reflexion is always preceded by an experience of failure. The experience of reflexion is further divided into leader and follower. These experiences are relative to a particular word or expression and always occur inside a situation of use, and can be roughly characterized as follows:

Experience of reflexion — leader
Reflective
Familiarity and self-confidence
Assumption of determinateness
'Ought' and 'back to the basics' attitudes
'Knows' criteria of success

Experience of reflexion — follower
Reflective
No familiarity, but trust
Assumption of determinateness
'Ought' and 'back to the basics' attitudes
Seeks criteria of success

4.1.4 Literal meanings and dictionaries

Information and literal meanings

So far we have given an account of the information carried by words and expressions, but we have not yet claimed that such an account is an account of literal meaning. Information has not been equated with literal meaning.

Information and literal meaning are not the same, since the notion of information does not, on its own, help us solve our perplexity with dictionaries. Literal meanings arise in our understanding when we pause and reflect about the information carried by words, along with a feeling that *this* information is what *this* word literally means, so *this* is how this word ought to be used.

A dictionary is a tool made for some purposes, and these purposes make us conceive of dictionaries as if they were repositories of the literal meanings of words. But since dictionaries give definitions of words by making use of other words, a dictionary can only be used by someone that already has a mastery, though incomplete as it may be, of the language in which the dictionary is written. A dictionary is not a mapping from words to entities called meanings.

When we consult a dictionary we are looking for the literal meaning of a word; we are not sure what a word means, are uncertain if it means this rather than that, or want to settle what a word means in a dispute or an explanation. A dictionary is, as it were, a repository of the literal meanings of words. Such a picture of what a dictionary is depends on how and why we use a dictionary. For if we *only* used dictionaries to give a lexicographic order to words, we would not think that a dictionary is a repository of the literal meanings of words (imagine that the definitions given in the dictionary were random concatenations of words, or random associations between words and definitions).

A dictionary does not provide a random association between words and definitions. It states what definitions go with what words; it shows what information a word carries in a given language (or what information anyone, as a potential produced and comprehender, is to associate with the word if he is to produce and comprehend the language in question). Dictionaries are relevant because they show how words ought to be used.

Roles of literal meanings

To obtain an account of literal meaning I propose to pursue the following strategy. Let us agree that such an account can be given by explaining what information is carried by expressions such as "w means that ...," "The meaning of w is ...," etc. (This strategy bears some resemblance with seeking an account of the meaning of "meaning").

I have argued that one way to conceive of the information that words and expressions can carry is in terms of their roles in practices. With this account of information at hand we can paraphrase the previous strategy in the following way. An account of literal meaning can be given by explaining what role expressions such as "w means that ...," "The meaning of w is ...," etc., play in which practices.

Hence, what we are looking for is an answer to two interrelated questions: (i) in which practices do expressions such as "w means that ...," "The meaning of w is ...," etc., play a role?; (ii) what role do these expressions play in these practices?

The present strategy is based on the idea that (one way) to explain a word is to give its meaning. For instance, to look up the meaning of "meaning" in the dictionary is a way to obtain an explanation of "meaning." To be sure, we are not literally going to pick up the dictionary and look up for the word "meaning." For an account of literal meaning is presupposed by the entry "meaning" in the dictionary, but such an account is precisely what we are looking for. Nevertheless, we are relying on the idea that our use of dictionaries is (one way) to give an explanation of a word, and that this use is part of our conception of literal meanings.[15]

[15]This step is quite an involved reflexive move and I feel it can use a bit more explanation. To begin with, one does not give the meaning of "meaning" in the same way as one gives a

Definition, explanation, justification

The practices in which expressions such as "What is the meaning of w?," "w means that . . . ," "w is this, that and the like," "Because this is what w means!," etc., play a role are the practices of definition, explanation, correction, and justification. In these practices we appeal to the bond between expressions and the information they carry. But such an appeal, although intuitively so conceived, can not be explained, as it were, by pointing to the expression and then pointing to its information. For information is not a thing. What these practices do is to appeal to some previously understood sayings and/or doings to bring about a shared understanding.

We explain to a child (or correct her with regards to) how to draw a circle, and by doing so we explain to her the word "circle," by drawing a circle in a piece of paper and having her doing it after us. We explain (and define) what a check mate is in the game of chess by showing several positions in the board and saying that the king is in check and can not move. We explain (and justify) that in our way back home from the office we did not pick up the groceries we were asked to bring because we forgot our wallet at home. The math student explains (and justifies) that in an Abelian group there is only one unit by making a proof of this claim in order to pass the exam. Etc.

To be familiar with these practices requires participants to be able to recognize, carry out, prompt, and respond to p-ings, that is, to doings and sayings that are instances of explanations, definitions, corrections, and justifications (for short I will refere to these practices as *explanatory practices*). An interesting feature of the doings and sayings that belong to explanatory practices is that they also belong to other practices. When a trainer is explaining something to a trainee, she is using doings and sayings of a given practice, though in a simplified way. Explanations, definitions, justifications, and corrections are always about a doing or saying that belongs to a relevant practice. There is a purpose to explanatory practices, though general as it may be. These practices are used to seek or establish a shared understanding.

Explanatory practices require two roles (not always only one person per role). I will call one of these roles the trainee, and the other the trainer. I introduce these labels just to keep track of the different roles, and to bring to the fore the asymmetry of these roles as regards their familiarity with respect to a given practice or practices (a qualification is in order with respect to justification, see below). The gist of these roles is that when trainee and trainer are in an expe-

ticket to the bus driver. To look for the meaning of "meaning" is to explain how we conceive meanings in everyday life, that is, when we reflect about it. Part of this conception of meanings consists in that (one way) to explain a word is to give its meaning, say, by looking it up in the dictionary. Thus, not only is it legitimate to seek for an account of meanings by inquiring into the meaning of "meaning," but the process of giving a particular kind of explanation is (part of) what "meaning" means.

rience of reflexion, and they do enter in such an experience at some point in an explanatory practice, the former will be in a follower stance and the latter in a leader stance.

Take the case of a professor giving a lecture, explaining and defining the axioms of Abelian groups to a number of students. The professor might well be experiencing success within his/her flow of action, and the students might well be experiencing success too. The professor is, nevertheless, explaining and defining and the students are participating in this practice. But it is quite normal that as the lecture progresses, situations occur where a student asks questions that break the flow of unreflective action, thus brining about states of reflection. Moreover, experiences of reflection were present when the professor was preparing his/her lecture, and will (most likely) be present when the students consciously study their notes. These experiences are mediated by the sayings and doings carried out by the professor at the time of lecture, so not just any experience of reflection is allowed. The purpose of the practice is, in any case, one of seeking to establish a shared understanding between professor and students.

The case of the math student presenting and exam, where she explains and justifies that every Abelian group has only one unit, does not involve necessarily a broken flow of unreflective action, nor is the trainee unfamiliar with the practice (on the contrary, she might be even more familiar with it than the trainer). Likewise with many cases of justifications. However, the point remains that these instances seek to establish a shared understanding, and that this practice is prompted by questions by the examiners. The student might well be in an experience of reflection when understanding these questions, notwithstanding the fluent and unreflective way in which she provides answers.

Another example is the solitary use of a dictionary. Though the actual situation contains just one person, she does seek for a shared understanding. That this understanding is (or ought to be) shared with other people lies in the fact that other people created the dictionary with the purpose of establishing a shared understanding; that the user can justify her uses of words by quoting the dictionary; that other people accept that what the dictionary states as the meaning of a word is how the word ought to be used; and that the answer to the question as to how a word ought to be used can be found in the dictionary. Moreover, the user is in a state of reflection with the follower stance (and the authors of the dictionary, at the moment of deciding on the definitions of words, in a state of reflection with the leader stance).

The previous description of these practices is only a starting point and it does not aim at capturing this broad and important topic. For instance, we have not mentioned different kinds of definitions (e.g., to give necessary and sufficient conditions, to give genus and difference, implicit definitions, etc.) or different kinds of explanations (e.g., scientific, deductive, probabilistic, etc.). Though rough as this description may be, it must suffice for the time being and the purposes at hand.

The role of 'means that'

Only very rarely do we use in our everyday life expressions such as "What is the meaning of w?", "w means ...", "w does not mean ..., but ...," "a w is ...", etc. But the claim is that we use them inside practices of explanation, definition, correction, and justification.

These expressions play specific roles, which lie, as it were, at the intersection between these practices and other practices. The paradigmatic case of this intersection is when the participants are engaged in a practice and the trainee breaks the flow of unreflective action to bring about a shared understanding of a saying or a doing of this practice. But always an explanation is an explanation of a saying or doing that belongs to a practice. Likewise with definitions, corrections, and justifications.

The paradigmatic role of these expressions is to prompt a state of reflection and to make the participants of the exchange take either the trainee or the trainer role. That these promptings have effect depends on a variety of motivations on the part of the participants. Social recognition, competition, retribution, feeling of overcoming, moral and ethical reasons, etc., lie behind the motivations to explain and be explained to. It is beyond the scope of the present work to give a detailed discussion of this topic.

When considered against the background of the roles of signs defined earlier, these expressions might play some of those roles. In particular, expressions such as "What is the meaning of w?" serve to prompt the practice of explaining. Expressions such as "w means ...", "w does not mean ..., but ...," "a w is ...", etc. serve to carry out acts of explanation, definition, correction, and justification. These acts are carried out by the trainer, and require a previous understanding, though incomplete as it may be, of the practice being explained (defined, etc.). Doings and sayings of explanation (definition, etc.) get entangled with doings and sayings of the other practice. Hence, these complex expressions (with the dots filled out) carry information that is determined by the roles that some of their smaller components play in the other practice.

4.2 Links with cognitive science

Despite the fact that the starting point of the present inquiry rejects a naturalistic approach to the information carried by language—i.e., that this sort of information is a natural kind—, as well as a reductionistic approach—i.e., that the account of information, to be truly explanatory, should reconcile the information carried by language with the world as described by the natural sciences—it is possible to draw interesting connections between the present account of practice-based information and some sciences, in particular cognitive science. I should

emphasize, however, that I can only make superficial remarks about this issue and that more in-depth studies shall remain as a suggestion for future work.

According to some, language is a human-specific property. Albeit some animal species have communication systems, none of them has the features that human languages have. Moreover, in conjunction with the individualistic frame of reference—i.e., the claim that properties of language mirror properties of linguistic competence—, these premises entail that a study of language boils down to a study of some human-specific abilities.

For instance, it is not uncommon to conceive of recursion as a human-specific ability that gives rise to human-specific features of language. Compare the following quote:

> One of the oldest problems among theorists is the 'shared versus unique' distinction. Most current commentators agree that, although bees dance, birds sing, and chimpanzees grunt, these systems of communication differ qualitatively from human language. In particular, animal communication systems lack the rich expressive and open-ended power of human language (based on humans' capacity for recursion) (Hauser et al., 2002, p. 1570).

We must note upfront that the claim that recursion is a defining feature of language/linguistic competence has already been criticized in chapter 2 above.[16] Furthermore, the discussion developed in the same chapter turning around incomplete understanding challenges the individualistic frame of reference.[17] Consequently, the question arises whether language should be conceived as boiling down to human-specific abilities.

As opposed to the not uncommon line of thought expressed in the previous quote, it follows from the account of information and intelligibility developed throughout this chapter that the abilities that we humans deploy in our uses of language are not specific to us, nor does the study of language come down to the study of individual abilities. I shall address these issues in turn.

4.2.1 Human-*specific* or just *human* abilities?

As far as the abilities that we deploy in our uses of language are concerned, the goal of discovering the specific abilities that are unique to human beings and that (purportedly) give rise to language seems misguided in the present context. Why does language arise from abilities that are unique to us? Because only we, human beings, have language? Such reason can only follow from a preconception about language—one that we have not endorsed here. However, animals use signs too. The ways in which we humans use signs need not be underwritten by abilities that we have and that no other animal possesses. Most of these

[16]Especially, see §2.2.2 and Scholz and Pullum (2007); Pullum and Scholz (2010).
[17]Especially, see §2.2.3.

ways, given their complexity and entwining, might well be unique to us, but the kind of abilities deployed in the exercise of these ways might be similar to the abilities of other animal species. And, in any event, should there be abilities that only humans deploy in the use of some particular signs, these abilities do not underwrite language-use in every case; there are myriad ways in which humans use signs, and linguistic signs in particular, that require no species-specific ability.

The reason for such far-reaching claim emerges when we consider the broad range of abilities that are deployed in our uses of linguistic signs. To this effect, we should recall our previous account of action intelligibility. We have claimed that our activities are inscribed in a two-fold structure of significance that contains a teleological and an affective component. The teleological component consists of a hierarchy of purposes and projects that we entertain in a given situation; the affective component consists of a range of emotions, moods, and feelings that we entertain in a given situation.

As actions, our uses of linguistic signs are also inscribed in such a two-fold structure of significance. Hence, a given use of a linguistic sign or signs is often, but not always, addressed towards the achievement of one or several of the purposes of the hierarchy, as well as the carrying out of one or several projects thereof. It is also often, but not always, addressed to respond to some of the emotions, moods, and feelings of the situation. Hence, the abilities that underwrite our uses of language are *a fortiori* also inscribed in such a two-fold structure of significance.

Thus, for some simple purposes, to use language might come down to saying so-and-so in order for the recipient to produce a response, which brings about the achievement of the simple purpose. For instance, to have someone else give something to her (e.g., "Pass the salt"); or to evoke a particular emotion or feeling in the recipient (e.g., "Cheer up"). At such level of description, this ability is certainly shared with other animals, say dogs that bark in such-and-such a way in order for its owner to bring them food; or that moan in such-and-such a way to evoke sympathy from its owner.

If we move along the affective component of our actions, we find that some uses of language are devised to address a range of emotions. Such addressing of emotions, in some cases, is shared with other animal species, e.g., to threaten, to evoke sympathy, to arouse, etc., but in other cases such addressing seems to be uniquely human, e.g., to greet, to leave-taking, to thank, to excuse oneself, to insult, etc.

Moreover, according to Tomasello's discussion of the "human cooperative motivations for communication" (2008, §3.2.2), it seems that although using language to request something from someone is a motivation that is shared in its general lines with the intentional communicative signals of all apes, the motivations to offer help to others without even being requested and to share feelings and attitudes about things seem to be unique to the human species. Consequently, some of the abilities that underwrite the uses of linguistic signs that address these motivations

for communication are human-specific (e.g., the ability to offer help, the ability to share attitudes), but others are not (e.g., the ability to request something).

As we move from a simple purpose to a hierarchy of purposes and projects, the abilities deployed in language-use to address this hierarchy become more sophisticated, although not necessarily species-specific. For instance, a particular linguistic sign can be used with the intention for someone to pay attention to a particular object (immediate purpose) in order for her to do something with it (mediate purpose). For instance, one can say "the door" to someone in order for her to realize that she left the door open as she came into the room, so that she closes it. Amongst the abilities required to deploy this use of language are the following: (i) the ability to determine what objects a person is paying attention to and what objects she is not paying attention to; and (ii) the ability to ascribe to someone the capacity to ascribe intentions and emotions to others. Indeed, in order to deploy such a use of language one realizes that this person just came into the room and left the door open behind her: she is not paying attention to the door after she entered the room. And one ascribes to this person the capacity to recognize one's discomfort with such a state of the door and the concomitant intention to make a change in it.

Though sophisticated as these abilities are, there is evidence suggesting that great apes have abilities much similar to those, and that their uses of gestures (although not their vocalizations) require a similar deployment of abilities. Tomasello claims that:

> Recent research has demonstrated that great apes understand much about how others work as intentional, perceiving agents. Specifically, great apes understand something of the goals and perceptions of others and how these work together in individual intentional action in ways very similar to young human children (Tomasello, 2008, pp. 44ff).

Indeed, some experiments suggest that apes understand that others have perceptions (compare ability (i) above), and that others have goals (compare ability (ii) above). That apes possess such abilities leads Tomasello to describe apes' uses of (some) gestures in the following manner:

> [A]pes' attention-getting gestures emanate from the communicatorâĂŹs social intention that the recipient *see* something, which he expects, based on his intentional understanding (in combination with past experience), will most likely lead her to *do* what he wants. This creates a two-tiered intentional structure comprising the communicator's social intention, as his fundamental goal, and his "referential" intention, as a means to that goal (Tomasello, 2008, pp. 50f).

It is worth noting that, though similar as these ape's abilities are to human children's, there is a fundamental difference between them. Experimental research has shown that although chimpanzees can communicate about entities that are

present in the field of vision, only humans can communicate about absent entities (Liszkowski et al., 2009). Hence, the ability to imagine or pay attention to absent entities seems to be a human-specific ability.

Furthermore, human-specific abilities seem to be those that exploit the kind of intention that Grice studied in his analysis of communication, namely, communicative intentions. It is Tomasello's contention that it is unique to humans that their communicative actions (or some of them, which is a nuance that, *pace* Tomasello, we should introduce here) are not only intentional, but that they also display the intention to be recognized as carrying this intention.[18] For instance, when John gives Mary a brand-new CD of Norah Jones, he has not only the purpose for her to get it, listen to it and enjoy it, but also to recognize John's intention for her to do that—this is an essential part of flirting. The important point is that while this ability—i.e., the ability to display/recognize communicative intentions—can be called human-specific, it is deployed on top of other abilities that cannot be so called and that are deployed in other uses of language.

4.2.2 Going beyond the individualistic frame of reference

Considering the question how to pursue an empirical study of language that conforms to the approach developed earlier in this chapter, one important thing to note is that such a study should not reduce to, although it should combine with, an empirical study of the abilities deployed by an individual in her uses of language. In fact, given that the information carried by language is not conceived as bestowed by an individual's mind, but as bestowed on signs by their roles in everyday practices, the study of the abilities deployed in the uses of signs is only half of the story. The other half consists in the (conceptual and empirical) study of the social interactions that underwrite the uses of signs in such-and-such ways and which allow these signs to carry the information that they carry. These interactions are, to be sure, the actual practices carried out by the members of a community at a particular period of time.

In other words, the information carried by language, being a complex phenomenon that involves a whole community—more particularly, it involves the interactions amongst the members of such community—, cannot be reduced to how this phenomenon presents itself to each member. For the properties of the complex phenomenon do not mirror the properties of the individuals.

David Marr presents this characteristic of a complex phenomenon—though in a different context—by means of the following, useful analogy:

[18] My reserve to fully agree with Tomasello's contention arises from his wholehearted adoption of Grice's model of communication; see my reserves with the notion of intention featuring in such model in §2.3.

> Almost never can a complex system of any kind be understood as a simple extrapolation from the properties of its elementary components. Consider, for example, some gas in a bottle. A description of thermodynamic effects—temperature, pressure, density, and the relationships among these factors—is not formulated by using a large set of equations, one for each of the particles involved. Such effects are described at their own level, that of an enormous collection of particles; the effort is to show that in principle the microscopic and macroscopic descriptions are consistent with one another (Marr, 1982, p. 20).

The halves-of-the-story of the information carried by language—i.e., individual abilities and practices—are not independent from one another. For we would not have the practices that we have if we did not have the abilities that we have, or that we have developed in the process of carrying out, or improving on, our current practices. Conversely, and this is perhaps the most relevant connection in the present context, a description of our abilities (or at least quite a number of them) is not independent from a description of the purposes that they help achieve, the emotions that they evoke, or of the activities that they underwrite.

Consider, for example, the following list of abilities:

a. The ability to convince,
b. The ability to seduce,
c. The ability to negotiate,
d. The ability to dissuade,
e. The ability to persuade,
f. The ability to charm,
g. The ability to amuse,
h. The ability to reckon,
i. The ability to multiply,

⋮

One cannot describe the gist of these abilities—i.e., what identifies these abilities and differentiates them from other abilities—without describing, in some cases, the purposes that they achieve (e.g., to dissuade, to persuade) or, in other cases, the emotions that they evoke (e.g., to charm, to amuse). Furthermore, in some cases a description of the activity that they underwrite is also required (e.g., to reckon, to multiply). In short, to describe an ability requires to describe a purpose, an emotion, and/or an activity. Hence, a study of our human abilities requires to take into account a study of our purposes, affections, and activities.

Moreover, our purposes, emotions, and activities are made sense of against the background of our social practices. The reason for this claim is simple: the

theoretical notion of a social practice that we have taken from Schatzki (1996) boils down to the organization of activities—i.e., sayings and doings—on the basis of practical understandings, rules, and a teleoaffective structure (see §4.1 above). In other words, our purposes, emotions, and activities are organized in practices. Hence, we can systematize the kind of abilities deployed in a practice by means of the organization of a practice.

On the basis of the organization of a given practice p—consisting of (A) practical understandings, (B) rules, and (C) a teleoaffective structure—, we can systematize the *abilities deployed by any person familiar with* p in the way shown in table 4.1.

	Comprehension abilities	**Mixed abilities**	**Production abilities**
A	To recognize p-doings and p-sayings To recognize p-inputs and p-outputs	To prompt p-ings To respond to p-ings	To carry out p-ings
B	To recognize p-rules	To respond to p-rules	To quote p-rules
C	To recognize p-purposes To recognize p-emotions	To respond to p-purposes To respond to p-emotions	To suggest p-purposes To verbalize p-purposes To evoke p-emotions To verbalize p-emotions

Table 4.1: Abilities that underwrite familiarity with a practice p.

A qualification is in order: given that not every practice's organization contains components (B) and (C), and if it contains component (C) it may not require a hierarchy of purposes or a range of emotions, the previous table of abilities must be adjusted accordingly.

Now, we comprehend and produce signs on the basis of our familiarity with the roles that they play in practices. But these roles are in turn systematically related to the organizations of practices (see §4.1.2). Hence, we can also systematize the kind of abilities deployed in comprehension and production of signs by means of the organization of a practice.

The abilities that underwrite uses of signs can be derived from table 4.1. Let "w" refer to a practice, "w-ings" to acts of carrying out the practice, and "w-s" to products of the practice (if there are such). We can systematize the *abilities of language-use* in the way shown in table 4.2. Note that the same qualification as before applies here.

To bring the point home, let us examine the following examples. To begin with, recall the above-mentioned example of using the expression "the door" to have someone who has just entered the room close the door. On the basis of our previous construction of a situation of use (see §4.1.3), we should describe

	Comprehension abilities	**Mixed abilities**	**Production abilities**
A	To attribute "w-ings" To attribute "w-s"	To prompt p-ings by uttering "w" To respond to "w" by carrying out p-ings	To carry out p-ings (when these p-ings are sayings)
B	To recognize p-rules	To respond to p-rules	To quote p-rules
C	To recognize p-purposes in uses of "w" or "w-ings" To recognize p-emotions in uses of "w" or "w-ings"	To respond to verbalized p-purposes To evoke p-emotions by uttering "w"	To verbalize p-purposes To verbalize p-emotions

Table 4.2: Abilities that underwrite uses of signs.

a number of elements. We shall take for granted a description of the practices of politely showing one's discomfort, denoted by p_1, and the practice of closing the door, denoted by p_2. The situation of use can be described as follows: (a) the participants are the speaker and the hearer; (b) the words are, among others, "close," "the door," "please?", etc.; (c and d) the practices are p_1 and p_2 and the roles of signs therein; (e) there are a number of standards of success, namely that the purpose be achieved, that the purpose be recognized and politely postponed, that the purpose be recognized and simply ignored, etc.; (f) as a means to bring about a shared understanding the speaker has the option to complaint and make her purpose and her standard explicit (either verbally or behaviorally). Finally, since in this context "the door" is sufficiently similar to "close the door" and given that there are few reasons to the speaker's recently prompted discomfort that have to do with the door, the hearer is able to comply and close the door.[19]

As regards the abilities required to deploy such use of language we can describe the following. On the speaker's part and as far as practice p_1 is concerned we require the following abilities: to evoke feelings of discomfort; to suggest one's purpose that one's discomfort be recognized. On the hearer's part and as far as practice p_1 is concerned we require the following abilities: to recognize feelings of discomfort; to recognize someone's purpose that her discomfort be recognized.

On the speaker's part and as far as practice p_2 is concerned we require the following abilities: to prompt closings of doors by uttering "close the door". On the hearer's part and as far as practice p_2 is concerned we require the following

[19]This is a rational reconstruction of the hearer's understanding the expression "the door" as used in this situation. I do not commit to the idea that there are rules governing the use of a particular expression to achieve a particular purpose (as far as a given standard is concerned). The previous reasoning from "the door" to the conclusion that what the speaker really wanted to say is "close the door!", though it can be called a reasoning in its own right, need not be validated in terms of rules (formal or otherwise). Moreover, the hearer need not make such transition in a reflective way; it might well be an unreflective reaction on the hearer's part.

abilities: the ability to recognize purposes in uses of "close the door"; the ability to close the door; the ability to respond to "close the door" by closing the door.

These abilities are summarized in table 4.3.

	p_1: politely showing one's discomfort	p_2: closing the door
Speaker	• to evoke feelings of discomfort • to suggest one's purpose that one's discomfort be recognized	• to prompt closings of doors by uttering "close the door"
Hearer	• to recognize feelings of discomfort • to recognize someone's purpose that her discomfort be recognized	• to recognize purposes in uses of "close the door" • to close the door • to respond to "close the door" by closing the door

Table 4.3: Speaker's and hearer's abilities in the "the door" situation.

A second example is the following. Suppose a child enters a butchery to buy a particular meat-cut, say beef chuck short ribs, that his mother wants to prepare for supper. The child has been given twenty euros and has been instructed to buy as much of this meat-cut as this money affords. The child asks the butcher "How much a kilo of beef chuck short ribs?" (he has learned by heart the name of the meat-cut, but he really does not know what it is). The butcher says "Six euros;" The child answers: "Three and one third kilos, please."

From this example we can extract the following: the situation requires butchery practices, buying and selling practices, and some basic arithmetic practices, for the expressions used in the example are only intelligible against the background of such practices. Hence, the participant's abilities must be organized in terms of their familiarity with such practices. These abilities are summarized in table 4.4.

To take stock: linguistic competence—i.e., the competence to carry out and comprehend uses of linguistic signs—is underwritten by cognitive, bodily, and affective abilities, and to find out—i.e., systematize and measure—these abilities constitutes the goal of an empirical study of linguistic competence. The consequence of the foregoing reflexion is that such an empirical study builds upon a given organization of the purposes, emotions, and activities that these abilities underwrite.

The abilities that underwrite linguistic competence, despite their general characterization, are practice-specific. Therefore, they are as general or as domain-specific as their concomitant practices are. Compare the abilities to ask for a meat-cut—which are relatively general—, the abilities to reckon, multiply and divide—which are general inside literated cultures—, and the abilities to cut a particular kind of meat in such-and-such a way—which are specific to butchers,

	butchery	buying and selling	arithmetic
Child	• to prompt 'butcherings'	• to carry out 'buyings' (by requesting the price of a quantity of a desired good) • to prompt 'sellings' (by requesting a given quantity of a good at a certain price)	• to carry out basic divisions and multiplications
Butcher	• to carry out 'butcherings' • to respond to requests of 'butchering'	• to prompt 'buyings' (by offering a given quantity of a good at a certain price) • to carry out 'sellings' (by requesting a certain amount of money for a given quantity of a good)	• to carry out basic divisions and multiplications

Table 4.4: Speaker's and hearer's abilities in the "beef chuck short ribs" situation.

but nevertheless play a definitive role in the information carried by the expression "beef chuck short ribs."

Last but not least, we can ask the question: what is specific to human language as opposed to the signal systems of other animal species? Answer: we should not ask what is specific to language, but we should ask what is specific to human practices.

4.2.3 Marr's levels of explanation adapted

How can we study each ability deployed in language use, as systematized by the above-mentioned proposal?: Marr's levels of explanation of an information processing device (Marr, 1982, §1.2) can be adapted to address this issue.

Marr's proposal contends that we must distinguish three different levels of explanation, each of which "involve issues that are rather independent of the other two" (*Ibid*, p. 25). The *top level* must explain "*what* the device does and *why*" (*Ibid*, p. 22). This level deals with a description, as precise as possible, of the task carried out by the device. It is Marr's contention that this description should determine a 'computational theory', the important features of which are "(1) that it contains separate arguments about what is computed and why and (2) that the resulting operation is defined uniquely by the constraints it has to satisfy" (*Ibid*, p. 23).

What enters in the explanation at this level must 'roughly correspond' to what the plain man knows to be true at first hand about such task (*Ibid*, p. 4). In other

words, the explanation has to take into account a number of aspects of people's everyday life, where the task to be explained actually plays a role. Compare:

> Think, for example, of the international network of airline reservation computers, which performs the task of assigning flights for millions of passengers all over the world. To understand this system it is not enough to know how a modern computer works. One also has to understand a little about what aircraft are and what they do; about geography, time zones, fares, exchange rates, and connections; and something about politics, diets, and the various other aspects of human nature that happen to be relevant to this particular task (*Ibid*, p. 5).

The *middle level* corresponds to the "choice of representation for the input and output and the algorithm to be used to transform one into the other" (*Ibid*, p. 25). Marr's example deals with the task of addition. First, the choice of representation for the input and output concerns the numerical system to be used to carry out addition (e.g., decimal, binary, hexadecimal, etc.). Second, the choice of representation for the algorithm depends on which representation was chosen for the input and output, but once this latter representation is chosen, there remain different alternative algorithms to carry out the same input-output relation.

The *bottom level* corresponds to the physical implementation of the algorithm. Here, too, there are different choices of implementation for each given algorithm (e.g., one can use either a serial or a parallel hardware to run the algorithm).

These three distinct levels can be adapted to explain the abilities deployed in language-use. For reasons that will become clear later on, I shall adapt these levels to the issue at hand in inverse order.

The bottom level at which we can explain a given ability deployed in a given use of language deals with the physic-chemical substrata of the organs involved in such deployment. For example, if the ability is that of attributing "symphony-s," one can study the physiological functioning of organs such as ear, brain, and eye. One might be interested in finding out how the ear and the brain perform during a person's recognition of a given symphony, in a task where a person listens to a recording and tries to classify it. It might be a substantial empirical finding that there are patterns of neural activity that occur when a person hears a symphony, as opposed to a sonata (and that these patterns are similar from person to person). But a symphony can also be recognized by its score, and then one might be interested in finding out how the eye and the brain perform during a person's recognition of a given symphony's score.

Note that we do not need to recognize necessary and sufficient conditions on physic-chemical reactions that define the ability in question. Indeed, one advantage of embracing an explanatory strategy based on Marr's levels of explanation is that though the levels must be compatible between them, they need not supervene on each other. In other words, the top and middle level, which provide

explanations of particular aspects of the ability of attributing "symphony-s," need not supervene on a unique physic-chemical reaction.[20]

Another example concerns the ability of attributing "flirt-ings." In this case one can look at the organs involved in vision and hearing, but also to the nose, the heart, the lungs, etc. All these organs might be involved in the recognition of flirting—think of when someone that you like is hitting on you and you recognize the flirting by feeling your heart's hard bumping and the butterflies in your stomach. Likewise, we do not need to recognize necessary and sufficient conditions on physic-chemical reactions that define the ability in question: you can attribute "flirt-ings" to someone flirting with someone else, or someone flirting with you that you are not attracted to, and in all these cases your ability is based on different physic-chemical reactions.

The relative autonomy between the bottom and the top and middle levels can be used to address the common claim in cognitive science circles that the meaning of a word is defined by a particular neural activity in a particular area of the brain. To begin with, these areas are usually identified by finding out the brain area that displays most activity when subjects hear or produce a word. But this area, being a statistical mean, when considering a single individual, can be activated or not in a particular use of the word—such areas might well be statistical fallacies. Moreover, given the relative autonomy between levels, if we were to find out that someone's brain does not display the same kind of activity in such particular area when she correctly understands or produces the word, we would hardly claim that she does not 'possess' the meaning of the word. For whether she correctly understands or produces the word is explained at a level other than the bottom level of brain activity.

At the middle level we face the task of representing inputs and outputs of abilities, as well as describing how inputs and outputs are related. Representing inputs and outputs is a task that, in our culture where schools and universities play a prominent role, is relatively familiar to us. Indeed, most of us have been exposed to reading tests (e.g., university qualification exams, GRE verbal, etc.) or mathematical abilities tests (e.g., university qualification exams, GRE quantitative, etc.). These tests are formal ways to represent inputs (i.e., tests with multiple-choice questions, essay questions, etc.) and outputs (answers to these tests). Tests are usually applied in somewhat controlled situations, but there are tests, such as those in experimental psychology, that are applied in as controlled a situation as possible, and where inputs and outputs have been represented as (quantitative or qualitative) variables.

[20]Marr makes this point to defend Chomsky against some critiques that do not distinguish between the levels. These critiques assert that Chomsky's theory of transformations "cannot be inverted and so cannot be made to run on a computer" (*Ibid*, p. 28). Marr's answer to this critique is that "finding algorithms by which Chomsky's theory may be implemented is a completely different endeavor from formulating the theory itself" (*Idem*).

To make this point clearer we shall explain the cognitive ability of referring to 'absent' entities (Liszkowski et al., 2009) as a relation between inputs and outputs, given a particular representation of inputs and outputs. To this effect we must analyze to some extent the reported experiment. To begin with, the purpose of the experiment is to show that prelinguistic infants, but not chimpanzees, can 'refer' to an 'absent' entity—i.e., an entity "displaced in time and space from the here and now" (*Ibid.*, p. 654).

The explanation of such ability requires a closer scrutiny of what 'refers' and 'absent' means, for they only receive a precise description in a context. Indeed, what "reference to an absent entity" means does not speak for itself—even more if the purpose is to show that a chimpanzee does not have such an ability. Thus, in this context, 'to refer' means 'to request by means of a pointing gesture'. What 'absent' means requires a bit more explanation of the experimental task.

The task is as follows—may my lack of knowledge as regards experimental psychology excuse the long quotes:

> In the current study, we confronted 12-month-old prelinguistic human infants and adult chimpanzees with two new situations in which they wanted something they could not see. In both situations, participants first repeatedly saw a human adult place several desired objects of the same kind on top of one platform, while also placing undesired objects of another kind on another, similar platform. Then, for the test, the desired objects were removed (*Ibid.*, p. 655).

An important aspect of the task is that subjects (infants/chimpanzees) should desire a number of objects—the 'desired objects', namely, toys for infants and food for chimpanzees. A platform then is made relevant for the subjects because all and only 'desired objects' are placed thereon. The extent to which the platform becomes relevant to the subjects is something to be found out once it is emptied and subjects are expected to request a 'desired object' by pointing to the platform.

It is worth noting that the target ability to be measured can be classified, in the systematization developed earlier, as a prompting of a practice, namely, to fetch an object to the requester under particular conditions. This requires that there be someone else that is able to recognize the pointing gesture as a request to fetch the object under these conditions, and that is able to fetch the object. In other words, the target ability is such that its gist depends on there being other people, in this case the experimenter, with particular abilities. The output of the target ability is then represented by the experimenter's deployment of her ability to carry out the fetching after a recognition of the proper request.

The task measures two different abilities, although they are represented by the same kind of deployment, namely, a pointing to the platform. The abilities are different because they relate different kinds of inputs to the above-mentioned output. These inputs are represented by the conditions under which the pointing occurs. In the task, there are two different conditions:

> In the *occluded-referent* condition, participants then saw the adult take another object of the desired kind and place it under its platform, out of sight. In this case, even though participants could not see the desired object, they knew it was there under the platform, and so they could potentially request it by pointing to its location (*Idem*).

In this condition, the input are: (i) the platform where 'desired objects' were usually placed; and (ii) a 'desired object' under the platform but out of sight. There is another condition:

> In the *absent-referent* condition, in contrast, after the adult removed the desired objects from the platform, she did not add any more, so that the usual location of the desired kind of objects was empty. In this case, if participants pointed to the now-empty platform, it would mean that they expected the adult would be able to infer that what they wanted was one of the missing kind of objects, that is, one of the kind both the adult and the participants knew was usually on that platform (*Idem*).

In this condition, the input are: (i) the platform where 'desired objects' were usually placed.

The results of the experiment show that most infants where able to request *the* 'desired object' in the occluded-referent condition, and most infants where able to request *a* 'desired object' in the absent-referent condition. As opposed to this, while most chimpanzees where able to request *the* 'desired object' in the occluded-referent condition, almost no chimpanzee was able to request *a* 'desired object' in the absent-referent condition. The results are summarized in the following table:

	Occluded referent	Absent referent
Infants	10/16	9/16
Chimpanzees	9/16	3/16

Therefore, infants, but not chimpanzees, have the ability to 'refer to absent entities' because they consistently deployed more pointing gestures under the absent-referent condition than chimpanzees did.

Now, Marr's definition of the middle level requires, besides a representation of input and output, a description of an algorithm that relates these representations. Though Marr's purpose is to show that compuational theory is an adequate framework to explain cognitive abilities, we need not share such far-reaching objective; we can remain neutral as regards the explanatory scope of computational theory and admit other valid ways to try and explain the relation between input and output, such as inferential statistical analysis.

The top level deals with the what and why of the abilities studied.[21] As discussed above, to describe the gist of an ability usually requires a description of a purpose, emotion, and/or activity. In turn, the latter description can benefit from a systematization in terms of a theory of practices. The level at which we describe practices is the right level at which we must describe the information carried by signs—and hence, this is also the right level at which we must describe the gist of the abilities that are deployed in the use of these signs.

However, we soon find ourselves in conflict with some of Marr's presuppositions (e.g., the computational theory of mind). Furthermore, though I have resorted to an analogy with Turing machines to try and make perspicuous my conception of practice-based information (see §4.1.2), I have also claimed that (i) such machines do not stand for (a representation of) the mind/brain, but for a collection of individuals—i.e., the Turing machine is a model of a complex system of individuals—; and (ii) such model has substantial shortcomings for the task at hand, such as explaining information dealing with emotions.

There are two separate approaches to the explanation of the what and why of abilities at the top level. One deals with an external explanation of the information that defines the gist of the abilities and the other with an internal explanation. The former kind of explanation consists in a sort of bird's eye view of the factors that usually make part of practices—the participants' required abilities, the practice's rules, and teleoaffective structure. It is an external explanation because no substantial familiarity is required with the practices involved, and hence only a very incomplete understanding of the roles of signs is required or provided. But such external perspective has the advantage of providing a somewhat uniform framework to describe a wide variety of practices.

As for an internal explanation, this requires one to take the apprentice's or the anthropologist's approach, in which a first-hand familiarity with the practices that underwrite the roles of signs is required. As discussed in chapter 2, different practices may require different degrees of initiation in order to understand what they are all about—compare soccer and reading. But clearly, such approach requires to take just a few practices at a time and hence the bird's eye view is almost completely lost.

Last but not least, these two approaches—i.e., external and internal—must be treated in coordination with one another. For a given practice might well be studied in its first instances on the basis of a general theory; and conversely a

[21] Marr contends that this level accounts for constraints that should uniquely define an operation. However, requiring such constraints is far too restrictive. For even addition cannot be uniquely defined by means of axioms—cf. non-standard arithmetics—, let alone the axioms proposed by Marr (see Marr, 1982, p. 23)—that is, the axioms of commutativity, associativity and inverses, which Marr claims to uniquely define addition, are valid for multiplication too. On the other hand, we can agree with a description of general constraints or characteristics that constrain to a reasonable degree what the operation that is to be explained at the top level is all about.

general theory does not arise out of the blue, but by reflecting on the similarities and differences among already first-hand-familiar practices.

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If my arguments and premises are sound, the idea seems justified that an explanation of the information carried by language requires to take practices into account. Such picture of linguistic information requires a radically different account of language—that is, as an open-ended collection of signs that appear in patterned ways and that play a role in our practices[22]—, linguistic competence—that is, as an embodied and embedded ability to achieve purposes with speech and writing[23]—, and linguistic communication—that is, as communicative actions the success of which depends on experiences of success and achievements of purposes. To be sure, when looking at the present proposal in hindsight, it seems that it rises more questions than it provides answers. This should not be seen as a principled shortcoming. Though rough and general as this proposal may be at this stage, I believe it provides us with promising tools to study our 'human world' and our 'human nature', in which language is paramount. I am also convinced that interesting connections can be drawn between my account and the account of others. However, a more detailed development of some aspects of these large topics shall remain as a suggestion for future work.

[22]By an *open-ended collection* I mean that no totality of things is recognized, which must either belong or not (or belong to a certain degree) to such a collection. That is, the actual extension of an open-ended collection is not a relevant matter. By *patterned ways* to use signs I mean that signs appear usually along with other signs, and that patterns of use can be discerned in a statistical fashion in a corpus of data; but there need not be any commitment as to the actual existence of these statistical patterns in the mind/brain of the speakers whose speech/writing belongs to such corpus.

[23]By *embodied* ability I mean an ability that requires exercise of the body, that can be trained, and that instantiates different levels of capability in different people in virtue of the properties of their bodies, such as playing the piano, dancing, etc. By *embedded* ability I mean an ability that is internally related to a broader framework of social practices; that is to say, an ability that only exists, and can only be understood, in the way it connects with such broader framework.