

Chapter 1

Information: Philosophical Analysis and Strategic Applications

1.1. Introduction

Nowadays, it is commonly considered that we live in an information society. Our civilization is abundantly fed by information and communication technology (ICT). In the military context, information has always been an invaluable and sought-after commodity to which special services are devoted. Leaders in all sorts of contexts – particularly military – have, for centuries, been aware of the importance of information. It is all the more paradoxical that in the area of philosophy, thinkers have largely ignored the concept of information. It appears only incidentally in philosophers' writings. It was not until thermodynamics, cybernetics and mathematical theorization of information took off that philosophers finally became interested in it, and even then, it was difficult to find a structured theorization centered on the notion of information.

In this chapter, we shall focus primarily on two aspects of this topic. To begin with, we shall look at the definition of an operational concept of information. In order to do so, following a brief state of the

art on current thinking about the notion of information, we turn our attention more specifically to the genealogy of the term, before going on to discuss two of the three thinkers whom we believe are the most important in the area of philosophy of information: Paul Grice and Fred Dretske. The work of these two philosophers will help to sculpt the precise definition of what information is, which will then be used in the second part of this chapter.

In this second part, we shall focus on the military domain, and see how the concept of information is used in that domain. In doing so, we shall present and critique the ideas of the third great contemporary thinker on information: Luciano Floridi.

Let us make it clear right now that while these philosophers help us to refine the concept of information which we shall use throughout this book, our ideas differ from theirs on a crucial point, because we reject the *alethic* conception of information – i.e. the idea that information must necessarily be *true*.

1.2. State of the art in philosophy

It is noteworthy that in the esteemed French reference dictionary of philosophical vocabulary – the Lalande – the term “information” does not appear. The work includes only the entry “to inform”, which is given in the scholastic sense – that of “giving shape to, organizing matter”. This view of the term comes directly from Plato’s *Timaeus*, where the demiurge imposes order on a disorganized physical world by giving it a form reflecting the order reigning over the world of Ideas. Apart from this primary meaning of the verb “to inform”, the Lalande recognizes a derived meaning, which is: “making somebody aware of something”. Granted, the Lalande dates from 1927, but none of the later editions, including that from 2006, have the entry “information” – at least not in the body of the text. It is only half a century after the Lalande first appeared that the tenth edition included a separate supplement containing the entry “information”. It is given a meaning derived from cybernetics: “an element of knowledge conveyed by a message which is its vehicle and of which it constitutes the meaning” [LAL 06]. In this definition, we can see the hallmarks of

the work of Shannon. The persistent practice of affording only a very limited place to the concept of information in a philosophical dictionary which is highly influential – at least in the French-speaking world – highlights the recent and underdeveloped nature of the philosophy of information. It should be noted that this neglect of the concept of information is not specific to the French-speaking world. If we look at Simon Blackburn’s *Oxford Dictionary of Philosophy* [BLA 08], we discover that even the second edition, revised in 2008, does not contain an entry for *Information*. It only has an entry for *Information theory*. This gives an indication of why philosophers gradually lost their indifference toward the concept of information during the latter half of the 20th Century. The domain known as “philosophy of information” first developed thanks to cybernetic research and the Mathematical Theory of Communication (MTC), then moved forward in the wake of philosophical explorations of the concepts of meaning and knowledge, and finally flourished due to the current development of the so-called “information society”.

1.2.1. *History*

The Lalande shows that, historically, the word “information” arose later than the verb “to inform”, from which it is derived.¹ In the work of both Plato and Aristotle, there is the idea that information is necessary for the passage of the *materia prima* from pure potentiality to actuality. This would remain the prevailing definition from Ancient times until the 17th and 18th Centuries, with the British empiricists (John Locke, David Hume). It is thanks to these empiricists that the verb “to inform” lost its original meaning and came to be understood in its current sense. The empiricists, abandoning the rationalistic credence whereby our minds come into this world already holding some innate ideas, attempted to explain how these ideas come into being. If the mind is not informed in advance, i.e. if it is not molded into a *form*, by the demiurge who leaves his mark upon it, imposing his seal which is constituted by innate ideas [DES 92], then we need a

1 For a detailed discussion of the history of the word “information” and its uses in Greek and Latin literature, we refer to [CAP 03], a version of which is available online at: <http://www.capurro.de/infoconcept.html#Studies>.

theory about the origin of our ideas. The choice of the empiricists, led by Locke [LOC 90] was to consider the mind as a blank slate upon which the world itself inscribes ideas when we interact with it. The second sense of the verb “to inform” and the notion of information as it is understood nowadays came from these considerations. The human mind is not naturally informed by any sort of demiurge; it receives its form from the outside world, which leaves its mark upon it. When we interact with the external world, it transmits to our mind some knowledge about reality. That is to say that the world *informs* our mind by imbuing it with certain ideas, certain knowledge. This gives us the derived meaning of the verb “to inform”, which no longer means simply “to model” or “to mold”, but also “to convey knowledge”. Information, therefore, is no longer merely the act consisting of shaping a material object, but also the thing that is conveyed during the production of ideas. This second sense of the word “information” is the prevailing one now, and is the one of interest to us here.²

In spite of the introduction of this second sense of the word “information” by the empiricists, it should be noted that no “philosophy of information” worthy of that title would develop at that time. Information was to remain a blind spot for philosophy and epistemology until the latter half of the 20th Century. In the 19th Century, there would be a tacit revival of thinking about information, with the work done on thermodynamics, and in particular the link, demonstrated by Boltzmann in 1894, between entropy determined by the second law of thermodynamics and the amount of information accessible. In the 1950s, Claude Shannon used Boltzmann’s work as the basis for the first mathematically rigorous definition of the concept of information. Paradoxically, it was only in the wake of Shannon’s work that philosophers began to turn their attention to the notion of information. Of these philosophical works, particular mention ought to be given to the distinction drawn by Paul Grice between natural meaning and non-natural meaning, the use of the notion of information by Dretske in support of an externalist

² It should be understood that for the time being, we are not formally defining the notion of information, but simply giving a preliminary analysis which we will improve once we have examined the relevant philosophical literature.

epistemology, and the recent work of Luciano Floridi, who has truly revived the field of philosophy of information (PI).

1.2.2. Information at the crossroads between epistemology and philosophy of language

There are two main philosophical domains wherein the notion of information plays a crucial role: philosophy of language and naturalized epistemology. In philosophy of language, an important question is how to define the meaning of the expressions of the language. How can we say that someone understands a word or an expression? Shall we rely on behavioral indicators? Is to understand a sentence to be able to translate it into another language? For technical reasons neither of these solutions were satisfactory. This problem was solved by Donald Davidson³, who posited that to understand an expression is to be able to state its truth conditions: this is the truth-conditional conception of semantics. In Davidson's view, the purpose of language is to provide us with information about the state of the world. Knowing the truth conditions of an expression is to know what state of the world would render that expression true. We can therefore consider that all expressions inform us about the state of the world. Hence, comprehension is nothing other than reception of the information encoded in language. One might therefore have expected logicians and philosophers of language who accepted a truth-conditional view of semantics to develop a school of thought centered on the notion of information. It did not happen. It was not until Dretske⁴ reflected upon Paul Grice's work (see [GRI 89]) that information came in, one might say through a hidden door, to philosophy of language and epistemology.

1.2.2.1. Meaning and information in Grice's work

It is precisely because Grice did not blindly accept the conventional view held by analytical philosophers – according to which “the essential business of language is to assert or deny facts” [RUS 22] – that he reintroduced the notion of information to

³ See [DAV 67].

⁴ See [DRE 81; DRE 95; DRE 00; DRE 08].

philosophy of language, albeit in a roundabout way. In a 1957 article, he revisited the notion of meaning. As an ordinary language philosopher, he refuted the thesis according to which the only legitimate use of language was to describe states of the world that can be evaluated. He distinguishes two notions of meaning, of which he says the following two utterances are paradigmatic:

- 1) Those spots mean measles;
- 2) Those three rings mean that the bus is full.

Grice shows that the notions of meaning at play in the first and the second example are very different. If we consider the first example, the link between the spots and the measles infection is automatic and indisputable. For instance, it would be nonsensical to say “those spots mean measles but there is no measles infection”. If the eruptions of the skin are indeed indicative of measles, their link with the disease is such that it is impossible to have them without being afflicted with measles. Furthermore, as Grice notes, it is impossible to deduce from “those spots mean measles” the consequence “measles is meant by those spots”. Note that such a deduction would be entirely possible in the example of the bus, where we can understand sentence (2) as being equivalent to “the driver means, by those three rings, that the bus is full and about to depart”.

Grice refers to the first sense of the verb *to mean* as *natural meaning*. In natural meaning, there is an unbreakable link between the two things being connected. One of these terms is an indicator of the other. The presence of a certain type of spots necessarily indicates that the person bearing them is infected with measles. In the case of natural meaning, it is (so to speak) intrinsically that the subject indicates the occurrence of what is meant. Hence, it would be contradictory to affirm at the same time that A means B and that A is occurring without B being the case. This is what led Dretske, commenting on this notion, to say that “natural meaning is information” [DRE 08]. Because natural meaning expresses an inalienable linking of two different things, it *is information*. This enables us to establish an initial link between the notions of meaning and information. One might, at first glance, imagine that meaning and

information are one and the same thing, as suggested by considering only natural meaning. If we take account of the indicative link which exists within natural meaning, we can test whether the connection characteristic of the notion of natural meaning is always true. If, for instance, I say that the number of rings in a tree trunk indicates the age of the tree, I am saying that those rings give us information about the age of that tree, and that the age calculated using this method is always correct. The number of rings therefore literally *means* the age of the tree. Now let us look at the second sense of meaning envisaged by Grice to clarify the notion of information.

We saw earlier that in the case of a ringing tone on a bus, it is possible to deduce from the sentence “Those three rings mean that the bus is about to depart” the sentence “Somebody is indicating, by those three rings, that the bus is about to depart”. Therein lies the main difference between natural meaning, which associates a symptom with its cause, thus giving us *objective information*, and the second sort of meaning Grice examines. In this second sort of meaning, the correlated variation between the two entities being linked is mediated by the human mind. There is necessarily a person who is using one entity to indicate the other. If, for instance, the public transport company instructs its drivers to ring three times to signal that the bus is full, that triple ring will come to *mean* that the bus is full. Each time a person who is aware of the local mores hears those three rings, he will inevitably understand that the bus is full. However, as Grice stresses, in this case there is not necessarily any causal link between the fact that the bus is full and the three rings. For example, there is no contradiction in exclaiming that “Those three rings mean that the bus is full, but the bus is only half full!” In the case of natural meaning, there is an impossibility of having A without having B given that A *means* B. For example, it is impossible to have a tree whose trunk has sixteen rings but whose age is not 16 years. On the other hand, the bus driver can ring three times whether or not the bus is full. This demonstrates that this second sense of *meaning* has an element of the arbitrary. It is for this reason that Grice dubs this *non-natural meaning*. With *non-natural meaning*, a connection is made *by the speaker* between two entities that otherwise would not necessarily have varied correlatively. It is the very fact that the person using

A to mean B, non-naturally, associates the two so that A ends up meaning B.

What are the exact characteristics of non-natural meaning? One possible definition would be that non-natural meaning is any association made between items that are not necessarily covariant, and intended to convey information. For instance, said Grice in this case, we would speak of non-natural meaning when a perpetrator leaves clues incriminating somebody else at the scene of his own crime. After all, the aim of such a tactic is to convey information (the culpability of an individual) by combining two items (in this case the crime committed and the clues left behind). Returning to the fictitious characters embroiled in the scenario around which this book is woven, suppose that General San-Gerio leaves the fingerprints of his enemy, General Quieto, on the weapon he has used to commit a murder. Would we, in this case, say “The presence of his fingerprints means that General Quieto is guilty”? Not really, Grice would maintain. We could certainly say “General San-Gerio is attempting to signify by these fingerprints that General Quieto is guilty”, or more accurately, “General San-Gerio is attempting, by leaving these fingerprints, to convey false information incriminating General Quieto”. Yet it would be a fallacy to affirm that: “The presence of his fingerprints means that Quieto is guilty”. Nevertheless, San-Gerio undeniably has the intention of conveying information indicating that Quieto is guilty. What this demonstrates, according to Grice, is that the intention of the person who makes the two signals covary is not sufficient to bring out non-natural meaning. What, then, do we need in order to be able to speak of non-natural meaning? It is certainly essential, in the case of non-natural meaning, that someone attempt to communicate information. Yet this is not sufficient. We still need to take account of the fact that recognition of that intention is essential to the accomplishment of the transmission of information. If we look again at the case of the ringing bell on the bus, the three rings come to *mean* that the bus is full because, not only is the driver instructed to trigger those rings to indicate to the customers that the bus is full, but also because everybody knows that the sound is triggered to that effect. Hence, there is a coordination of the mental states (here, beliefs and intentions) of the different members of the relevant community, which

results in a covariation between the sounds of the bell and the filling of the bus. Given that the non-natural lexical meaning emerges because of a coordination of the mental states of the people involved, it is not a case of transmission of an objective and necessarily true piece of information. In a given system, we can have an item A which comes to *mean* B even if the link between A and B is totally arbitrary and is valid only by virtue of the coordination of the mental states of the individuals who share in that code.

What do these musings of Grice's tell us about the notion of information? Firstly, we can accept that information is what is transmitted in our interactions. If, like Grice, we refuse to consider sense and meaning *in abstracto*, but attempt to understand them within a general theory of rational communication, we come to realize that information is what is transmitted in our meaningful interactions. In light of this, we can say that – unlike the view held by Bar-Hillel: that “semantic information intrinsically has nothing to do with communication” [BAR 55] – information, semantics and communication are interlinked. Without information, there is no meaning because information is the content that we try to capture and encode in language. The second thing which Grice shows us is that, in the same way that we can speak of *natural meaning* and *non-natural meaning*, we ought to draw a distinction between two sorts of information: *natural information* and *non-natural information*. This runs counter to the current consensus of practitioners of philosophy who are interested in information. This consensus is, in effect, that there is an inalienable link between information and truth.⁵ We should not speak of information unless that which is being transmitted is true. Although there is consensus surrounding this view, we believe that taking non-natural meaning into account shows that it should not be accepted. Indeed, in cases of non-natural meaning, a piece of information is certainly transmitted by way of the recognition of our intention to form an association between two entities. If we accept, as our preliminary definition of the notion of information, that given by [LAL 06]⁶, we can see that non-natural meaning does indeed

5 For instance, see [BAR 64; DRE 81; FLO 10; FLO 11].

6 Reminder: “an element of knowledge conveyed by a message which is its bearer and of which it constitutes the meaning.”

communicate to us an element of knowledge, if only relating to the thinking of our interlocutor. The difference with natural meaning is that while in the first case, it is objective and irrefutable information that is transmitted, with non-natural meaning, the information transmitted is mediated by the human mind. Hence, this sort of information is fertile soil for disinformation, deception and the different types of information warfare which we shall go on to discuss in the remainder of this chapter. If there were only the objective information encoded in natural meaning, such manipulations would not be possible. It is because we can also convey non-natural information using the recognition of our intentions that we are able to manipulate that recognition so as to convey false information.

Note that Grice himself did not appear to accept this notion of false information, as he wrote “False information is not an inferior kind of information; it just is not information” [GRI 89, p. 371]. In our view, however, there are three good reasons not to attach a great deal of importance to this reticence. The first is that accepting a notion of untrue information would help to better account for the genuine usages that are made in information warfare, where deception and the transmission of false information is important. The second is that the notion of non-natural meaning appears to directly legitimize the notion of false or non-natural information. The third and final reason is that this oft-quoted sentence from Grice is a lapidary affirmation concluding a discussion (itself only summative) of the maxim of quality in the retrospective epilog to [GRI 89]. Therefore, we do not think it is justifiable to take this sentence as expressing a fully worked-out thesis by Grice, as does [FLO 11], for instance. Before coming back to these questions, let us look at the other great thinker on information in the 20th Century: Fred Dretske.

1.2.2.2. *Information and knowledge in Dretske’s work*

“In the beginning there was information. The word came later.”

[DRE 81]

At its beginnings, Dretske’s project was purely epistemological. His interest lay in giving a naturalistic analysis of the notion of

knowledge in the purest analytical tradition. Because Gettier [GET 63] had shown that it was no longer possible to content ourselves with the conventional definition of knowledge as justified true belief, there was a need to produce a new definition of the notion of knowledge, and it is in this context that Dretske's work emerged. Using a naturalistic framework, Dretske believed it was essential to provide an objective and biologically-plausible description of the process by which humans went from perception to knowledge. Thus, he found himself developing a philosophical reflection centered on the nature of information. Actually, information was only of interest for Dretske because, according to him, "information is necessary for knowledge" [DRE 08]. The idea is that in order to know anything at all, we need to be *informed* of it. Knowing is nothing else than receiving, processing and understanding relevant information about the object of the knowledge in question. Hence, a naturalistic theory of knowledge cannot do without a theory of information. What *is* information, then? In order to answer this question, Dretske begins by drawing inspiration from Shannon and Weaver's mathematical theory of communication (MTC), but departs from it on a crucial point: the aforementioned two authors focus less on the content than on the informational channel.

Remember that MTC sought to measure the amount of information transmitted from one point to another. [SHA 48] only defined information incidentally. In order for there to be communication, Shannon tells us, there must be a source S , a channel c for transmission of the information and a receiver R of that information. If the source the source S has a set of possible states s_1, \dots, s_n , each with a given probability of occurrence ($p(s_1), \dots, p(s_n)$), then the quantity of information generated by the occurrence of the state s_i is given by the following formula:

$$I(s_i) = \log(1/p(s_i))$$

Whilst MTC is capable of quantifying the information generated by an individual occurrence, Dretske quite rightly points out that this theory is primarily concerned with statistics. It is significant that it is another formula – the one about the average amount of information

generated at the source – that is best known in MTC. In this case, we speak of entropy. This formula is as follows:

$$I(S) = \sum p(s_i)I(s_i) = \sum p(s_i)\log(1/p(s_i))$$

This formula expresses that the average amount of information generated at the source is defined by the mean of the $I(s)$ weighted by the probability of occurrence of each state.

Similarly, we can calculate the amount of information received at the other end. The receiver R also has a very definite number of possible states $r_1\dots r_n$, each with a given probability of occurrence (probabilities therefore ranging from $p(r_1)$ to $p(r_n)$); the amount of information generated by the occurrence of the state r_i is given by the following formula:

$$I(r_i) = \log(1/p(r_i))$$

Again at the level of the receiver, MTC averages the amount of information received using the following formula, which is exactly symmetrical to the one we saw earlier, except that it applies to the receiver rather than the sender:

$$I(R) = \sum p(r_i)I(r_i) = \sum p(r_i)\log(1/p(r_i))$$

Given these definitions, we can see that Shannon's concern was to quantify the information arriving at R based on the amount to be found at S by studying the degree of noise introduced by the channel c . His was a purely formal project, disregarding the content transmitted and focusing on the conditions of the transmission and the amount of information transmitted. Hence, MTC has no semantic concerns; its only goal is to calculate the quantity of information transmitted from S to R , and to determine the statistical properties of c . It is here that Dretske parts company with MTC.

Dretske's priority was to advance a *semantic* theory of information and to justify our ordinary concept of information. He felt that MTC was inadequate for this task because it tells us nothing about the particular piece of information that is transmitted, contenting itself to quantify that transmission indiscriminately. In [DRE 81], Dretske gives the following account of where he diverges from the MTC: "In

standard applications of communication theory, the interest centers on the *source* of information and on the *channel* for transmitting this information, and for purposes of describing these aspects of communication, there is no reason to be interested in the particular messages transmitted. But we are here concerned with the particular messages, the particular content, the *information* that gets transmitted from a source over a channel” [DRE 81, p. 52–53]. If he felt compelled to take an interest not only in the amount of information transmitted but also in the very nature of that information, it is because in his view, perception is the basis upon which a naturalized epistemology should be constructed. Information is of interest to Dretske because it gives rise to knowledge by being perceived and processed by the knowing subject. In his theory, perception is none other than a “particular kind of information-carrying experience”, and belief and knowledge are “merely specialized informational states in certain living organisms” (see [DRE 00: IX]).

Owing to this epistemological approach, Dretske needs a notion of information with very specific characteristics. In particular, he needs information to always be true. The reason for this requirement is that Dretske begins by defining knowledge as “information-caused belief” (see [DRE 81; DRE 00]). This definition of knowledge is modeled upon the features of perception: I know that *s* is *P* in the context of perception if, not only is it the case that *s* is *P* and that I believe *s* to be *P*, but also my belief is caused by the fact that *s* is *P*. For example, in the case of vision, it is not sufficient that I believe the sky is blue in order to know that the sky is blue; this belief has to be caused by the objective fact that the sky is blue. An immediate objection to such a definition is that it risks disqualifying cases where knowledge is acquired through testimony. Is it possible for a blind person to know that the sky is blue? However, this objection is not prohibitive. We can, in fact, answer simply by saying that the blind man knows that the sky is blue because someone who does know that has told him so, and that it is essential that that person know it because of direct access to perceptual information.⁷

7 Or indeed by the testimony of someone who has such perceptive access!

If we combine this definition of knowledge as “information-caused belief” with the fact that knowledge is supposed to always be true, we can see that information itself needs to be infallible. It is this infallible nature of information that Dretske encapsulates in his definition of the informational content of a signal:

“A signal r carries the information that s is F =The conditional probability of s 's being F , given r (and k), is 1 (but, given k alone, is less than 1)” [DRE 81, p. 65].

In this definition, k is the totality of the knowledge that the subject already holds. We can see with this definition that information is an objective property of the signals. More generally, Dretske holds that information is necessarily objective, natural and truthful. He clarifies his thinking on this point when he writes that “information is a commodity that, given the right recipient, is capable of yielding knowledge” [DRE 81, p. 47]. This means that although our capacity to glean information depends on the background knowledge we already have, the information in itself is independent of us and is capable of giving rise to knowledge, whether or not we are there to receive it. More clearly even than Grice, Dretske holds that information must necessarily be true. His arguments are, on the one hand, that our ordinary concept of information implies truth, and on the other, that if information were not necessarily true, it could not be used as the basis for a naturalistic epistemology, given that knowledge is necessarily true. We still believe that this view is flawed. First, it is not possible to rely on the fact that our ordinary concept of information implies truth to conclude that information is necessarily true. The aim of philosophy is precisely to analyze our ordinary conceptions and, if needed, reform them. As regards the statement that because information must serve as the basis for knowledge it must necessarily be true, it is a *petitio principii*. If we place ourselves in a strictly naturalistic context, there is nothing to guarantee the factivity of knowledge. The factive nature of knowledge could be an entirely unnatural conceptual elaboration.

Let us recap. In our foregoing discussion, we have seen that philosophy, for a long time, neglected the concept of information, and that it was only in the 20th Century, under the influence of science, that

philosophers began to take an interest in it. We have also seen that the 20th Century's two main thinkers on information – Grice and Dretske – share the idea that information is an objective and necessarily true entity, serving as a support to meaning when that meaning is natural. This is the alethic view of information. Counter to this conception, we have advanced the idea that untrue information does not appear to us to be contradictory, or indeed to have been solidly debunked by the aforementioned authors. Thus, we propose to define information as that which is transmitted during our meaningful interactions. Therefore, as happens with meaning, we can distinguish between *natural information* which is naturally true and *non-natural information* which, depending on the coordination of the mental states of the agents, may be false. In what follows, we are going to focus specifically on the way in which these notions of information can be exploited in the military domain.

1.3. Information warfare

Meaningful interaction, as mentioned above, may take a wide variety of forms. In ideal cases of communication, it may certainly be benevolent or neutral. In other cases, it may take place within a hostile or even warlike situation. Considering – as we do in this chapter – that information may not necessarily be true enables us to continue to speak of “information” even when it is false, particularly in such conflict-ridden contexts. Whether someone deliberately omits certain pieces of information or transmits misleading ones, these pieces of information are like weapons in communication. The extreme case involving players in latent or open warfare lends information the status of a military tool.

In classic military treatises such as Sun Tzu's *Art of War*⁸, information plays a crucial role in victory as a tool of “soft power” – either in addition to or instead of the weapons of the so-called *material* fields. By using it, the combatant is able to adopt a position in *immaterial* fields. As well as, or instead of, fighting in the physical areas of land, sea, air and space, he positions himself in the far more

⁸ See [SUN 94].

subtle theater of communication and cognition. Using the tool that is information, the combatant can continue to act in material fields – in an operation of war *by way of* information – or indeed act in the enemy’s immaterial field – in an operation of war *on* information. Any operation by way of information requires a prior operation on information: an informational maneuver designed to lead the enemy into making inappropriate decisions in the material field is preceded by a maneuver in the immaterial field to shape the mental states of belief and intention of the adversary. The “art of war” has a component where information and its multiple facets play a crucial role in tactical and strategic successes or failures.

In spite of the antediluvian nature of information warfare, it has come to be of crucial importance from a military point of view, because of two concomitant and interrelated circumstances: the development of ICT, which means that anyone is capable of exchanging ample quantities of information, and the advent of so-called *asymmetrical* conflicts, wherein a State is forced to counter or combat a nebulous non-State entity, such as a terrorist organization, which is not highly structured and has far fewer material resources than its adversary, but has weapons of more or less equal power in the immaterial field of information. In order to take account of these changes, contemporary armies delimit the concepts associated therewith, constructing doctrines for what they call *information operations*, defined thus: “a set of actions carried out by the armed forces, directed and coordinated at the highest level, with the aim of using or defending information, the information systems and decisional processes, in support of a strategy of influence, and contributing, by these operations, to the achieving of the final target state, whilst respecting the defended values.”⁹

Far from being limited to the military domain, information warfare has potential and homologous extensions in the domains of economics, politics, media and others. In his book *Information warfare* [VEN 09], in the introduction the author refuses to define information warfare, because the domains it affects and the disciplines concerned are so many.... However, we can give a number of

⁹ See [CIC 12].

observations which help to understand the fundamental mechanics of information warfare, from a conceptual point of view, without departing from the philosophical viewpoints presented above.

1.3.1. *The role of falsehood and of intentions*

In the framework devised by Luciano Floridi to define information, a tree diagram is frequently used.¹⁰ Figure 1.1 shows a reproduction of that part of the tree diagram which is of interest to us in this chapter.

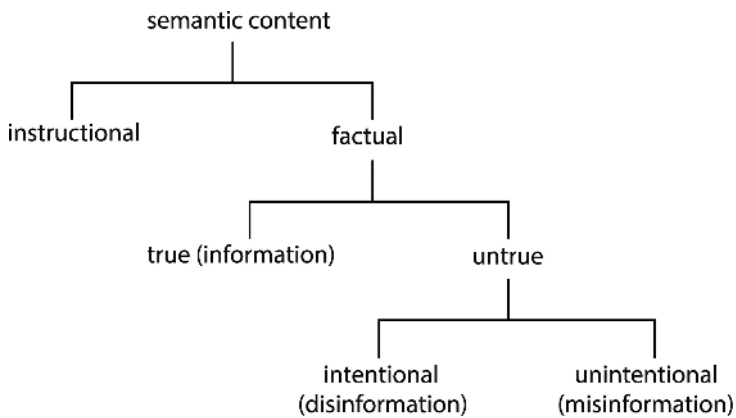


Figure 1.1. *Tree diagram of information, taken from [FLO 10]*

The *semantic content* at the root of the tree does not relate only to that which is informational. Content of an instructional nature corresponds more or less to what is found in a user manual for a machine, whilst factual content begins to look like information. According to Floridi, a piece of data cannot be defined as information unless it is *true*. Indeed, Floridi invokes Grice and Dretske to exclude the taking of false data into consideration as information. However, in the context of information evaluation upon which this collection is based, it is clear that this condition of truth cannot be retained. In the coming chapters, for the notion of information, we use the whole of the factual branch of Floridi's tree: the content is undoubtedly factual,

¹⁰ See [FLO 10; FLO 11].

but not necessarily true. Otherwise, to return to the military classification of information evaluation – where information is divided into two dimensions: source and content, evaluated on two distinct scales¹¹ – *all* information would have the maximum possible truth score, and it would be unimportant whether the source is more or less reliable, because that which is transmitted (the information) must *always* be taken as true... In the philosophical tradition, Floridi's position is in line with the classical definition of knowledge¹²: a *true* and justified belief¹³, although in more commonplace language the notion of knowledge does not presuppose truth (absolute certainty may in fact be wrong). A piece of information in the strictest sense must be true, whereas a piece of information in the broader (and certainly more usual) sense may be true, false, or of intermediate veracity, and it is this broader sense which we shall use here.

Now that we have established this, we also need to look at the other branches of the tree, starting from the node of factuality. If the content of what is communicated is not true, there is an alternative consideration: did the speaker or transmitter of the information have the *intention* to transmit false information or not?¹⁴

In the branch whose extremity represents what Floridi calls *disinformation*, the two notions present (falsehood and intentionality) form a fairly natural connection between the notion of disinformation and that of lying. Regardless of the definition we take for it, it is commonly accepted that a lie is intentional and is intended to affirm something which is false – or at least which the liar believes to be false. By introducing lying into the examination of information in the broadest sense, we are led to envisage a rather similar scenario but which has not yet been represented: that whereby the information transmitted is true, but the intention is that it not be. To begin with, an

11 Readers can refer to Chapters 3 and 4 for a discussion of these military classifications.

12 See section 1.2.2.2.

13 Note, however, that even this definition, taken from Plato's *Theaetetus* has largely been discredited by [GET 63].

14 The intention under discussion here relates to the information transmitted with falsehood; it does not relate to the transmission of the information. It is implicit that the transmission itself is intentionally made; the rest is debatable.

inexpert liar may behave in this way, transmitting true information without intending to. Floridi's tree diagram can therefore be extended, acquiring an extra leaf, which gives a more harmonious view of the notions hither to introduced:

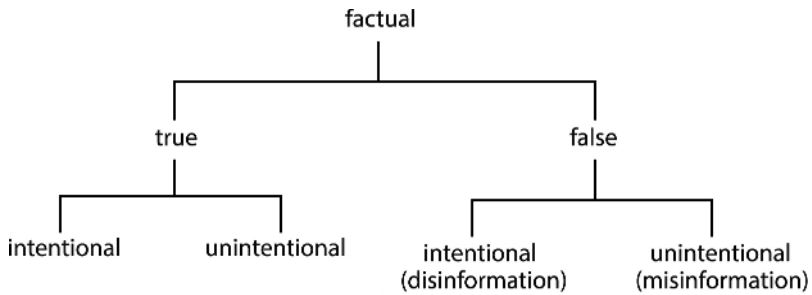


Figure 1.2. *Information tree: truth and intention*

With this symmetry established, other notions can expand the semantic information tree; we shall now introduce a number of such notions.

1.3.2. Deception, simulation and dissimulation

The term *deception* is widely used by the armed forces and is applicable to numerous paradigmatic scenarios in information warfare. According to the official NATO definition, deception is a set of “measures designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce him to react in a manner prejudicial to his interests.”¹⁵ These measures are sometimes taken in ways which are not related to information, but always have a definitive impact on the created information that the enemy receives. For example, the bombardment of an enemy city which is not of strategic importance, and which the attacker knows to be strategically unimportant, may be an operation of deception, the goal of which is to convey the idea, by the information transmitted to the enemy that the

¹⁵ See [NAT 12]; the definition has not been changed since it was first published in 1973.

bombardment has taken place, that the attacking forces have incorrectly assessed the priorities of the country they are attacking. The intended “error” caused in the minds of the enemy may come directly from the information, and sometimes, as in this example, indirectly *via* the material event which gave rise to the information.

Traditionally, there are two possible types of measures making up an operation of deception: measures of *simulation* and measures of *dissimulation*. General Francart recalls the distinction and contextualizes it in France’s strategic approach: “In France, the term ‘*déception*’ is specially reserved for simulation [a component in deception (active measures) whose effect is to fool the enemy about the allied intentions and possibilities by conveying false information to them] and dissimulation [a component of deception (passive measures) whose effect is to hide allied forces and their movements from the enemy’s investigations]”.¹⁶ For example, an assault tank painted green and covered in foliage will be dissimulated (or hidden) from the sight of an enemy aviator; a lifesize cardboard model, carefully made and painted gray will suggest a tank and a target for the same aviator. In both cases, we are dealing with a piece of information that is ultimately transmitted to the enemy with the aim of duping them. Simulation and dissimulation are not mutually exclusive. The same tool, the very same practice may serve to transmit a message simultaneously by simulation and by dissimulation; if we slightly reinterpret the text of the *Aenid*, the Trojan Horse is a means of simulation of an offering left by the Greeks who had supposedly sailed away, and which the Trojans can therefore use to ensure the prosperity of their city, convinced by the arguments of the Greek spy Sinon, and also a means of dissimulation of Greek soldiers in its belly. In this case, there is a twofold message: information about the presence of an offering is transmitted, at the same time as the implication of the absence of the enemies responsible for the offering (*a fortiori* about their absence inside the offering) is also transmitted

¹⁶ See [FRA 00, p. 191-192]. At the start of the 17th Century, the distinction between the two concepts was discussed in an essay by Francis Bacon, *Of Simulation and Dissimulation*, reproduced in the collection [BAC 05].

by the silence about the maneuver. Misleading information induced in the mind of the enemy can also stem from a gesture implying that *another* piece of information was unknown to those performing the maneuver: Winston Churchill was aware of the Germans' plans to bomb Coventry, but he allowed it to happen so that the enemy would not suspect that the Brits had deciphered the secret German code used to communicate in preparation for the bombardment. Simulation of false knowledge (the city is not going to be bombed, so there is no need to evacuate it) helps the dissimulation of true knowledge (the secret code has been broken). The subtle distinction between these two joint types of information is, unsurprisingly, reminiscent of the distinction between a lie *by action* and a lie *by omission*.

It must be pointed out that here we are extending the definition of information proposed by Floridi still further. We accept not only that a piece of information can be false, but also that the *withholding* of information implies that a transmitter may possess information but not divulge it. The existence of information therefore no longer depends on the existence of any receiver or addressee. Overall, dissimulation is intended to withhold information: here, nothing is communicated, and yet we accept here that there is an implicit piece of information underlying that lack of communication. Therefore, Floridi's tree becomes even more denser, because before the branch-off between true and false, there is a division between transmission and withholding. The new tree therefore takes on the facet shown in Figure 1.3, if we leave aside the terminologies previously adopted by Floridi for disinformation and misinformation.

The methods typically used for simulation and dissimulation are many, and all of them find parallels in the animal and plant kingdoms (e.g. chameleons, stick insects or carnivorous plants). The historian Barton Whaley [WHA 82] subdivides the methods for simulation and dissimulation, associating them with categories of actions which have their correspondent in those kingdoms (see Figure 1.4).

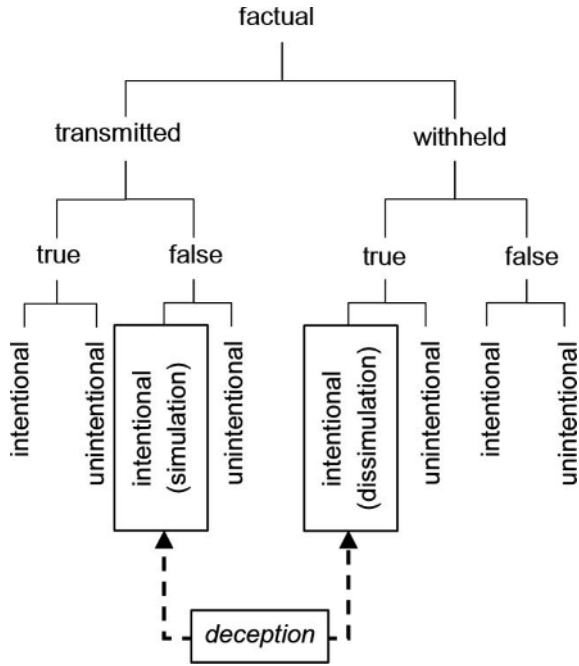


Figure 1.3. Simulation and dissimulation in the information tree

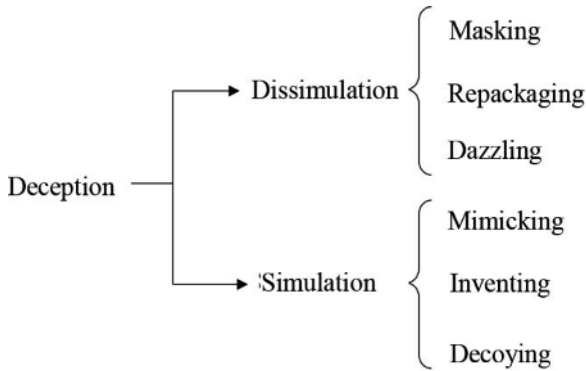


Figure 1.4. Deception, simulation and dissimulation according to [WHA 91]

However, these verbs minimize the possibilities of resorting to dissimulation, and with good reason, because the same strategy has no genuine equivalent in animals or plants: nowadays in particular because of the existing techniques, it is possible to very effectively hide a piece of information, by communicating it to the enemy but *swamped* in an ocean of other information. At the opposite extreme to withholding information, the tactic here is to provide too much rather than too little. In both cases, the adversary is disarmed: the relevant information is not available to him, whether it has been hidden or transmitted. On that point, Figure 1.3 is no longer sufficient either, because Floridi's tree diagram makes no allusion whatsoever to the amount of other information surrounding the piece of information that is represented.

In [CAR 11], the philosopher Thomas Carson puts forward a succession of different definitions, first for lying and then for deception. For the latter, all the definitions proposed contain the following clause, unlike lying: a deception must necessarily be successful – there is no such thing as a failed maneuver of deception. If the Trojans had not believed that the horse was an offering, or if the Greeks had been discovered in its belly, the simulation or dissimulation would have failed, and the entire deception would have ended in failure in either case. It is true that lexically, just as happens with misleading or dupery, deception necessitates success: we can take back a lie, but we cannot take back a mislead, which must necessarily already have succeeded. In order to respect this linguistic obligation whilst remaining faithful to military terminology, let us say that it is an *attempt* at deception which can fail, and that deception in the true sense of the word corresponds to a successful attempt. Carson represents the different possibilities for relations between lying and deception as shown in Figure 1.5.

As we can see, in Carson's view, there are attempts at deception and indeed deceptions which are not mendacious. We shall come back to this point below, as we discuss disinformation.

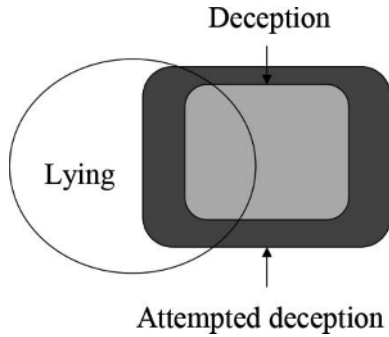


Figure 1.5. *Attempted deception and lying [CAR 11]*

1.3.3. Addressees of information or the art of communicating

Another way of deceiving someone using simulation and dissimulation simultaneously is to address many different people at once when transmitting a single piece of information. Let us return to the fictitious example used in this book of the troubles in Ektimostan, extended by the additional element that a spy in the pay of the dissident Usbek is sending reports from his post in the Ektimostanian Ministry of the Interior. Suppose that the spy is a double agent: he is in fact in the service of the Ektimostan regime and is duping Usbek. When he tells his hierarchical superiors that the 31 May attack is attributable to actions internal to the regime in place and is unrelated to the independence faction, the aim is to convince them that this is the case. Yet in the same message, he wants to convey to his true superiors (the Ektimostanians) that he is doing his job as a double agent. In any situation involving three or more visible people, the scenario can be reconstructed: X appears to address Y, but knowing that Z is listening. With modern-day technologies, it is still easier: if X writes an e-mail to Y and copies Z in (CC: Carbon Copy), Z knows that X has written to Y, but Y also knows that Z knows that X has written to him, and so on. This message is *common knowledge* (the term used in epistemic logic and game theory) between the three protagonists. In the fictitious scenario, the double agent sends his e-mail to Usbek, but puts the Ektimostan authorities in the BCC (*Blind Carbon Copy*) field. Ektimostan knows that Usbek has received the

false message, whereas Usbek has no inkling that Ektimostan is aware that he has received the message at the same time.

Thus, information warfare uses interlinked pieces of knowledge on which the attacker can ably act, sometimes with identical messages: the informational content here comprises the content of the message *stricto sensu* (the body text of the e-mail), but also the visible or hidden addresses of the multiple addressees. To Usbek's eyes, the spy is *dissimulating* his true nature as a pro-Ektimostan double agent and *simulating* his role as a pro-Usbek spy.

1.3.4. Information warfare as a play on beliefs

In summary and more generally, simulating is tantamount to making somebody else believe something that we believe to be false, whereas dissimulating is tantamount to hiding our own beliefs, and more importantly our intention to hide those beliefs, from someone else. The beliefs and knowledge of the transmitter and the receiver of the information play an essential role in any information operation in a hostile context. With Floridi, these propositional attitudes of belief and of knowledge are essentially absent, which is legitimate in the context of his strict understanding of information, but is no longer legitimate with the broader acceptance adopted here.

Furthermore, in a simulation and in a dissimulation, the information transmitted may relate to something other than the simple object of its transmitter's belief. With lying (by way of action), the liar in his assertion may not necessarily make use of the fact that its content is true. He may use a different proposition, generally relating to the proposition in question but which is not necessarily identical to it. Hence, it may perfectly well be a question of communicating something about what he believes, in order to lead the target, in accordance with his probable ways of thinking, to infer from it that which the liar actually wants him to believe.

In philosophical literature, there are many definitions of lying, some of which are cataloged in [CAR 11]. To take only one forward

here, we can cite the definition given in [CAP 12], where φ and ψ are two propositions:

- 1) the liar believes that φ is false;
- 2) he believes that if he tells his target that φ , then she will believe something about φ , notated as ψ ;
- 3) he has the intention for her to believe that ψ ;
- 4) he tells her that φ ;
- 5) he has the intention for her not to believe that he believes that φ is false.

Similarly to in measures of deception, we see in this definition both simulating and dissimulating aspects. Clause 4 corresponds to a measure of a *simulation* of the liar's true beliefs. Furthermore, the intentions may be more numerous than simple simulation of his own beliefs: clause 5 reflects an intention of *dissimulation* – here to conceal his beliefs. Whilst clause 1 reflects the reality of the situation, the ultimate objective of the maneuver of deception, combining simulation and dissimulation, is expressed by clause 3. The beliefs of the actors in the play of information warfare clearly appear crucial for the success of that play. In that as well, Floridi's tree is altered: it is not so much a branch-off between true and false that needs to be considered, but rather between what is believed to be true and what is believed to be false by the transmitter of the information.

1.3.5. *Disinformation and associated notions*

The comparison of deception with lying is not meaningless. [GER 11, p. 96] holds that “deception is the truly military facet of disinformation”. However, what is closer to lying than disinformation, if we accept the generic sense in the very abundant usage made of the term today?

Is disinformation mendacious in itself, though? Some definitions of disinformation given by a variety of authors are indicative of the difficulty in precisely defining the notion: “A punctual or continuous action, which consists, using any and all means necessary, of leading

an adversary into error or favoring subversion in his mind with the aim of weakening him”¹⁷; “disinformation consists of deliberately propagating false information in order to influence an opinion and weaken an adversary”¹⁸; “disinformation consists of the elaboration and deliberate communication of a false piece information, carefully disguised to present all appearances of authenticity. In the context of wartime military operations, disinformation is identified with deception. [...] More specifically, disinformation appears to be a collective enterprise of design, manufacturer and diffusion of a falsified message, whose sole aim is to fool the targeted receiver in order to benefit from the positively erroneous usage he is liable to make of that information”¹⁹.

It is difficult to argue with such definitions, which sometimes contradict one another, because the concept is so changeable and the word so recent, although the phenomenon which it denotes is as old as warfare itself. In order to better characterize the term, and force it to correspond with certain circumstances which we would tend to label as instances of disinformation based on our fictitious scenario; it is helpful to use some of the clauses of the definition of lying put forward above.

The well-known apologue of “The Boy Who Cried ‘Wolf!’” shows us that if we wrongly claim something too frequently, no-one believes us when the claim is true. In an adaptation of this fable, suppose that an Ektimostanian blogger has always been considered by Usbek to be a puppet of the regime in spite of his claims to be an opponent: every entry on his blog makes reference to events to the glory of the Ektimostanian State – events which Usbek knows to be false, through other channels. For months, and each new entry on the blog confirms this, the blogger is believed to be a liar, and through lassitude, in the Usbek camp, people come to form the opinion that everything that he writes is false. On 3 June, on his site, the blogger champions the idea that the attack on 31 May is attributable to the *Free Resistance of*

17 *Dictionnaire de l'Académie française*, 9th edition.

18 For instance, see [HUY 00], or a number of texts by the same author.

19 See [GER 11, p. 58]. Note that for Géré, deception is closer to simulation than to dissimulation.

Dagbas (FRD). The scenario then changes: suppose that it is true that the FRD carried out the attack, and the blogger wants Usbek to believe the contrary. In this scenario, the information transmitted on 3 Jun is *true* (the individual *is not lying*), but it is tempting to label this operation as *disinformation*. In fact, it is not on 3 June that the blogger is sowing disinformation, but rather *throughout* the entire length of the existence of his blog – a means of the overall informational maneuver which comes to a head on the final day, when for the first time he tells a grain of truth. Thus, although lying is involved in this disinformation stratagem, it is not lies which, in the final analysis, are likely to fulfill the hopes of the disinformer, but rather the *truth* of his final statement! An extreme case would be a disinformer who has a reputation as a liar with his audience and knows it, but who has not in fact lied in the past. He need only cry “Wolf!” as soon as the wolf appears, the audience will be convinced of the contrary, and no false information has been disseminated. The constraint of being “counter to the truth” could therefore be superfluous in the definition of disinformation.

At a more fundamental level, the various definitions put forward above seem to lack an essential factor which is present any time disinformation occurs: *belief*. It must be recognized that Huyghe holds up the role of “influence”, Géré that of the fact of “fooling the target receiver”. This suggests that the disinformer wishes to act *on* the beliefs of his audience. Yet is this the only occurrence of beliefs in the process of disinformation? In the previous example, the blogger does not content himself with shaping Usbek’s beliefs: constantly, the entries in his blog are based on Usbek beliefs, or more specifically, they are based on the belief that the blogger himself has of Usbek’s beliefs. At least as much as an operation *performed on* beliefs, this is an operation *on the basis* of beliefs, beliefs about beliefs, etc., – in summary, on the basis of the *crossed beliefs* of the protagonists. Similarly, in the extreme example of the individual who has been nothing but truthful but has the reputation of being a liar, the fact that he uses his knowledge of his reputation with others – a reputation which itself expresses a belief on the part of his audience – enables him to carry out his operation without resorting to lies: the disinformer, as much as he wants to *alter* the beliefs and knowledge of

his audience, uses *reason* in order to do so *on the basis* of those beliefs and knowledge (basing his reasoning on his own beliefs).

One thing appears to impose itself when we look at undeniable cases of disinformation: influencing the audience is always tantamount to (attempting to) inculcate a belief in them which is (or which the disinformer believes to be) false. It is here, rather than anywhere else, that truth or falsehood comes into play. It is not the information conveyed that needs to be false, but rather the future content of belief in the addressee's mind which is or needs to become false if we are dealing with characterized disinformation.

Thus, let us put forward a more precise (though of course imperfect) definition, more or less closely mimicking the structure of the definition of lying:

- 1) the disinformer believes that something about φ , notated as ψ , is false;
- 2) he believes that if he tells his target that φ , then she will believe that ψ ;
- 3) he has the intention for her to believe that ψ ;
- 4) he tells her that φ ;
- 5) he has the intention for her not to believe that he believes that ψ is false.

Suppose that ψ is the opposite of φ . Note then that from the very first clause in the above definitions, lying is noticeably different from disinformation. Indeed, if the disinformer believes that φ is true (i.e. that its opposite is false), then by saying that φ , he is not telling a lie. By that clause, it is very possible that disinformation could be accurate, as in the case of the Ektimostanian blogger whose final act of disinformation is not untruthful.

Our definition enriches the presentation of disinformation by Floridi given in section 1.3.1: the role of the beliefs of the agents becomes highly important here. In addition, the intricate connections between beliefs and intentions are made explicit. Nevertheless, the

relationship between disinformation and deception set out above remains compatible with considerations made in the definition of disinformation and the position of deception in Figure 1.3; it is merely suggested in addition that deception is a form of disinformation such as it is practiced in a military context. There is indeed dissimulation of belief and simulation of belief, more subtly than in the case of lying.

There is no consensus about the definition of disinformation; also, the definition put forward above can be broadly criticized, depending on the usage that each individual makes of the term. The same is true of other, similar notions, such as those of propaganda or intoxication. As we saw above, Géré states that deception is a form of disinformation considered to be military. To simplify the relationships between these notions, it is tempting to adopt a similar point of view to establish the implicit relationship between propaganda and intoxication: propaganda is aimed at a large crowd of people – as illustrated in the very well-known works of Tchakhotine [TCH 39] or Klemperer [KLE 03] – without the addressee having any connection to armies, and it is sometimes considered to be more closely related to publicity than to a warlike tactic, as in Bernays' well-known work [BER 07]. Conversely, intoxication, while the mechanisms involved appear to be very similar, seems to be reserved to the domains of warfare and espionage, so Table 1.1 gives a distribution of the notions on the basis of the addressees.

All addressees	Disinformation	Propaganda
Military addressees	Deception	Intoxication

Table 1.1. *Notions of information warfare, general or military contexts*

Yet this distribution is, doubtless, still open to debate, because it is possible to speak of self-intoxication without being able to see what self-propagandization might be (with the exception, perhaps, of a form of the Coué method). Self-intoxication occurs in cases where the source of information himself becomes intoxicated, e.g. in an intelligence service where one of the members considers an intoxicating piece of information emitted by one of his colleagues

with different intended addressees to be worthy of interest. In this scenario, there is certainly no individual self-intoxication, but a collective self-intoxication which affects a department containing several people.

Regarding the relationship between disinformation and propaganda on the one hand, and deception and intoxication on the other, in view of examples which might be brought to mind from the existing body of literature, historical examples or examples from the cinema, it is helpful to consider that the second term is a very accentuated version of the first: Goebbels' propaganda was a barrage of disinformation, in the same way as intoxication is deception practiced in a high dose. However, these terminologies can be adjusted, doubtless at the cost of the clarification of the concepts which constitute these notions with fuzzy boundary.

1.4. Conclusion. Comprehending information in order to evaluate it

In this chapter, we have sketched the general form of the trajectory of the notion of information in philosophy. As it was not truly considered until the 20th Century, the three main philosophers mentioned here – Grice, Dretske and Floridi – all more or less held that a piece of information, in order to be worthy of the title, must necessarily be true. Because of the arguments championed here, and in order for the question of information evaluation to truly be posed, this near-axiom is rejected for our purposes, which opens the door to the considerations of conflictual contexts where information plays a crucial role.

With this in mind, we note that the tree diagram initially put forward by Floridi, in an extended view of information, proves highly inadequate: it could, once it has been developed, taking account of the intentions and beliefs of the protagonists, the means employed and their degree of usage in the particular domain in question, more closely resemble a true, bushy copse. Given the multitude of possibilities on offer for an information strategy, an adversary to whom information is addressed is faced with the difficulty of understanding which branch of the tree he is dealing with. This is

precisely the problem with which an analyst, charged with evaluating the reliability of the source of a piece of information and the truth of its content, needs to overcome in order to achieve a proper *evaluation of the information*.

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