ISSN 2096-031X
CN 32-1859/H

Language and Semiotic Studies

语言与符号学研究

Winter 2016
Volume 2 Number 4

Language and Semiotic Studies
Volume 2 Number 4 Winter 2016

Language and Semiotic Studies

Language and Semiotic Studies

语言与符号学研究

Winter 2016
Volume 2 Number 4

Epistemological Prolegomena to the Cognitive Semiotics of Evolution and Development

Göran Sonesson
Lund University, Sweden

Abstract

Rather than being a model, a method, a philosophy, or an intellectual movement, semiotics is best considered a special perspective on the world of our experience, which, in ideal social circumstances, gives rise to a new scientific discipline. Classical semiotics has developed several constructs for exploring the similarities and differences between sundry semiotic resources, such as language, gesture, and pictures. Although the semiotic tradition, going back at least to Greek antiquity, is very rich, it has in recent decades been seen as lacking adequate tools to take the empirical turn. It has not created reliable empirical methods for the study of semiotic resources, nor has it extended the study to the diachronic axis. In the tradition from cognitive and developmental psychology to cognitive science, however, such methods have been elaborated, and diachrony, both in the form of child development, and of evolution, have been given their due. On the other hand, none of these traditions sports the sophisticated theoretical constructs of semiotics. Therefore, we have created cognitive semiotics, which brings the methods, findings and theories of contemporary cognitive science and semiotics together, and uses them to design experimental situations elucidating the nature of semiotic resources. In order to do so, we need to have recourse to an interplay of phenomenological analysis and experimentally constructed situations. In this essay, we will try to situate semiotics generally, and cognitive semiotics in particular within the field of the sciences. We will also discuss the need for diachronic studies, when applying semiotic theory to the bio-cultural co-evolution of the human species.

Keywords: humanities, experiments, evolution, culture, phenomenology

In order to delineate the rudiments of a cognitive semiotics of evolution and development, we will start by considering the specificity of semiotics, conceived as taking on the

heritage of the compounded human and social sciences, and, at the same time, bringing something new to the concoction. In so doing, I will suggest that semiotics is a kind of "meta-analysis", at least if the term is taken in the sense of Paul Bouissac (1999, p. 4), as applying not only to the comparison of statistics, but, more broadly, as "consist/ing/ in reading through a large number of specialised scientific publications, selected among the published literature in one or several domains of inquiry, and of relating the partial results within a more encompassing model than the ones that are held by the various specialists concerned". Contrary to Bouissac, however, I will insist on semiotics being a meta-analysis with a twist: the reading, selection, and relating at issue all involve the way in which objects acquire meaning to the human (and largely also the animal) mind (see Sonesson, 2012a). In the second part, I will spell out the position of a semiotics so conceived within the so-called "Humanities debate", both as it occurred in the 19th century, and as it was given new impetus by Jürgen Habermas in the 20th century. Clearly, cognitive science is also a kind of meta-analysis in the sense indicated, although less addicted to the search for meaning (which is not to say that some representatives of cognitive science, particularly those with a phenomenological bent, are not so inclined), and certainly more predisposed to make use of experiments and other explicitly empirical methods. This sets the task for our third part: to show that, by combining the assets of these two approaches, thus bringing about cognitive semiotics, we will obtain an intellectual instrument more apt to draw the human and social sciences together, and to elucidate their common core, while putting them into relation to biology, neuroscience, and evolutionary theory, without reducing the former to the latter. An essential part of this work will consist in setting up an agenda for the study of human bio-cultural evolution and child development, which both are essentially diachronic studies, and thus fundamentally foreign to classical semiotics (though this is not really the whole story). The fourth part of this paper will be concerned with drafting such an agenda and looking at the mechanisms which it requires.

1. Semiotics as an Intellectual Tradition and/or a Discipline

It is customary, but misleading, to think of semiotics as a method or a model that can be applied to other sciences, mostly within the humanities and the social sciences. Nor does it make sense to consider semiotics as a particular philosophical movement. In some countries, and at some universities, semiotics has made it into the university schedule, but this is still often not the case. I will here maintain that semiotics is a particularly systematic way of pursuing a number of problems emerging from a particular point of view taken on reality, as well as the solutions given to these problems and the new problems resulting from these solutions, together forming a tradition which can be pursued through the centuries. The only thing lacking for this being a definition of a discipline is the institutional framework making it into a university subject. The same thing may be said about cognitive science, though, as a tradition, it is considerably

younger. As for cognitive semiotics, which purports to unify these two traditions, it is even more often an intellectual tradition, rather than an institutionalized discipline.

1.1 The methods and models of semiotics

A century after Saussure declared that the place of semiotics within the system of sciences was determined beforehand, we are still not sure that there *is* such a science. Jean-François Bordron (2012) suggests that something becomes a science essentially for social reasons, which is a diagnosis I made myself some time ago (Sonesson, 2008). But even if we can explain why semiotics has had much less social luck than cognitive science in many countries, we may think there are reasons for claiming that semiotics, rationally considered, should be a science. At the same time, many people would probably find the idea of evaluating the usefulness for the human sciences of the semiotic model, the semiotic method, or the point of view of semiotic philosophy easier to grasp. The problem is, nevertheless, that there are many semiotic methods, models, and philosophies. The unity of semiotics must be found somewhere else.

From an epistemological point of view, it is easy to ascertain that semiotics can in no way be a method or a model. Not to overburden our argument, let us define a method as a series of operations which might be applied in ordered stages to an object of study, with the goal of yielding information of a particular kind about the object studied; and let us similarly decide that a model is a simplified, but still more or less iconic, representation of the object studied which can be more easily manipulated than the real thing, and which (ideally) has the advantage of representing classes of objects of a particular category, rather than a single object, so that, when methodological operations are applied to it, it yields information about the category of objects concerned.

For someone who is not a complete outsider to semiotics, and who thus identifies it with French structuralism (even including postmodernism), and who is not such a consummate insider as to identify it with the model he or she favours, it must be obvious that there are many models in semiotics, and while some of them may be compatible, others manifestly exclude each other. Semiotics, just as all other sciences, contains a wealth of models, as well as a panoply of methods. When one particular model and/or method is attributed to semiotics, it is obviously being confused with one of its manifestations having course during some particular period, most probably the movement known as French structuralism, which was popular in the 1960s and 70s, but which has since lost its relevance in most quarters. It may rightly be said about French structuralism that it tried (mostly in vain) to apply a linguistic model (itself abusively derived from the linguistic structuralism developed, notably, by Saussure and Hjelmslev), as well as to implement (but completely failing to do so) the method of the same linguistic school.

Semiotics as such is not restricted to any single method, but is known to have used several kinds, such as an exhaustive analysis of concrete texts, or *text analysis* (comparable to distributional analysis in linguistics and "explication de texte" in literary studies), as well as—to too small an extent, I am afraid—classical *experimental technique* (well-known

from psychology) and imaginary variation of properties, or *system analysis*, reminiscent of the kind of reasoning found in philosophy, most explicitly in phenomenology. In addition, semiotics has employed a hybrid form of text analysis and imaginary variation, which I have elsewhere called *text classification*, notably in semiotically inspired rhetoric, as conceived by Groupe μ and continued in my own work (cf. Sonesson, 1996, 1997, 2010a): instead of trying to exhaust the meanings contained in any single text, it derives some (binary) properties from an imaginary variation and searches for texts which manifest them. Bouissac (1999a, b) also talks about four "ways of acquiring knowledge" within semiotics and elsewhere, which partly correspond to my division: "experiment" and "reasoning" has obvious parallels, "serendipity" would for me be something occurring at certain moments within the other strategies, and "meta-analysis" is an aspect which I have not mentioned, but to which I will turn below.

There is no reason to consider semiotics necessarily dependant on models taken over from linguistics, simply because this was the case around the last mid-century: Nevertheless, the construction of models remains one of the peculiar features of semiotics, if it contrasted with most of the human sciences. Indeed, semiotics differs from traditional approaches to *humanitas*, whose domain it may partly seem to occupy, in employing models that guide its practitioners in their effort to bring about adequate analyses, instead of simply relying on the power of the "innocent eye". After having borrowed its models from linguistics, philosophy, medicine, and mathematics, semiotics now is much in need to start the serious elaboration of its proper models (see Sonesson, 2008). The question then becomes what kind of models this might be. Jean Petitot (2012) argues for mathematical models as a substitute for what he calls formal models, inspired in logic and computer languages. Such formal models, however, would seem to be a fact of cognitive science rather than of semiotics. The homemade formalism of the Greimas School probably would not qualify here. Together with René Thom, Petitot was of course one of the first to apply mathematical, and more precisely, morpho-topological models to semiotics. On the other hand, Bertrand and Canque (2012) reject formal models precisely in the guise of the catastrophe theory propounded by Thom and Petitot. Catastrophe theory has not been a success in biology, they claim, because life is meaning, and few meanings have any specific morphology. For my part, I think they have a point. But what kind of models you find adequate depends more, in my view, on the epistemological viewpoint from which you do semiotics than on semiotics as such.

1.2 Semiotics as a particular branch of philosophy

When determining the specificity of semiotics, the first misstep consists in adopting the popular misconception, according to which the semiotic field is inhabited simply by the followers of Peirce and Saussure. In the first place, there is no reason (more than a superficial terminological coincidence) to assemble such a motley crew amalgamating two such dissimilar doctrines as those represented by the elaborate but fragmentary philosophy of Peirce, and the marginal, if suggestive, annotations of Saussure. But, more

importantly, in adopting this point of view, we would be unable to account, not only for the semiotic work accomplished well before the time of our two cultural heroes, be it that of the stoics, Augustine, the scholastics, Locke, Leibniz, or the ideologues, but also for much of contemporary semiotics, some parts of which are not particularly indebted to any of the forefathers.

In an article in which he says many sensible things in defence of semiotics, Umberto Eco (1988, pp. 323ff.) comes up with a very strange conception of what the latter is: on the one hand, he admits that there are certain specific semiotic sciences, such as those which study the interpretative habits involving events in verbal language, gestures, traffic signs, pictures, and so on; on the other hand, he claims that there is a general semiotics, which simply postulates the concept of sign, thus permitting us to speak about superficially dissimilar things within a unified framework. The latter, he maintains, is not a science, but a philosophical activity, and this is in his view demonstrated by the very proliferation of different conceptions of what semiotics is. Indeed, he goes on to say, semiotics is a variety of the philosophy of language, which has the particularity of going beyond the study of statements, to the underlying activity, and which does not limit itself to a single semiotic system, verbal language.

It is interesting that Eco should admit that the studies concerned with specific semiotic phenomena are sciences; but there is no doubt about that because some of these sciences existed well before modern semiotics was in the works. The study of verbal language, for instance, has long been known as philology or linguistics. In some cases, however, this conception would require the establishment of new disciplines: there is, for instance, no well-accepted branch of knowledge involved with the study of gesture, which is still largely treated within anthropology or psychology, or under the absurd and misleading heading of "non-verbal communication". In recent decades, no doubt, there seems to be a consensus for using the term "gesture studies"—although one of the founding fathers of the speciality, Adam Kendon (2004) seems to have ever more qualms about the use of the term "gesture". The semiotics of pictorial signs is even more in need of being established as an independent discipline, because art history has never been interested in pictures as such, but only in a series of pictures considered each in turn, and the findings of recent perceptual psychology have to be brought into contact with more systematic studies, similarly to the way in which post-Chomskyan linguistics has been related to psycholinguistics. The rudiments of a body of knowledge corresponding to a semiotics of pictures already exist; but it can hardly be considered a well-established discipline.

This part of Eco's thesis was actually formulated well before him by Luis Prieto (1975a, b), who argued that disciplines such as anthropology, ethnology, sociology, psychology, literary history, art history, history of religion, archaeology, and so on, should more aptly be called the "semiotic sciences", rather than being distributed among the social sciences and the humanities, because what they have in common is that they are involved with meaning. Eco (1988, p. 351) himself points out that while the natural sciences are interpretations of the first degree, the semiotic sciences are interpretations

of interpretations. Here, Eco would seem to rejoin classical hermeneutics (see Ferraris, 2002). This characterization, undoubtedly, also applies to what archaeology does with artefacts left in some prehistoric burial; it may not apply to the radiocarbon dating of these artefacts, but it certainly applies to the interpretative frame in which the resulting dates are later inserted and given a meaning (see Sonesson, 1994). More obviously, it applies to most things done in art history, though, once again, the study of artistic materials is only indirectly contained within this description, because of the chemical analyses being made on substances defined for an "artistic" purpose.

But Prieto allowed general semiotics to subsist and to remain a science, although at another level of generality. Although Prieto is not very clear about the nature of this general semiotic theory, his own work within the domain seems to imply the conviction that it should not only furnish the semiotic sciences with a coherent framework, before the specific disciplines can accomplish their task, but that it would also be called upon to compare the results of these disciplines, in order to determine how different resources for conveying signification may differ. Whether or not this common framework consists in the concept of sign, or if something different, or something additional, is needed, it seems strange to say that this framework is simply "postulated" by a philosophical movement, as Eco maintains. If so, all these disciplines would only be valid, given a particular philosophical framework, and for someone not sharing this framework, all these particular domains of study would have nothing to contribute. In the end, then, specific semiotics would also be given over to the whim of philosophy.

Curiously, Eco even claims that the fact of there being different semiotic points of view demonstrates that semiotics is a philosophical activity; but, at the very least, this would show that semiotics is a class of different philosophical and/or scientific activities. Actually, a much more natural conclusion would be that, just as sociology, psychology, archaeology, literary history, and so on, semiotics can be practised from the point of view of different philosophical conceptions. Thus, there may be a structuralist semiotics, a nominalist semiotics, a phenomenological semiotics, and so on—just as there may be, for instance, a processural and a post-processural archaeology, a positivist and a post-modernist art history, and so on.[1]

Semiotics, to adopt Peirce's phrase, needs to get out of the "philosophical soup shops" (CP 1.11). All sciences have once separated themselves from philosophy—a process that of course (as we shall see) always leaves a residue in the tureen. Meanwhile, this is a fact that makes it difficult to compare philosophy (as Bordron, 2012 proposes to do) to other disciplines: if semiotics is ever being successful, another swig will have been taken out of the philosophical soup. In any case, a bigger gulp has already been taken by cognitive science.

1.3 Semiotics as an interdisciplinary endeavour

Those who look upon semiotics as a method or a model often themselves take up a position outside of semiotics. Eco's claims, however, are made from within semiotics

itself. A more commonly voiced point of view among people closely involved with semiotics is that it is "an interdisciplinary perspective". I find it difficult to see the point of this description. Either it means that people representing a lot of other more well-established disciplines come together at semiotic congresses; but, if so, it does not describe any situation which is original to semiotics, and there is no reason for this state of facts having to determine the future of any discipline. Or it really means that semiotics itself is something "in-between" other disciplines. If so, that is not particularly new either: from social psychology to cognitive science, other disciplines have been born out of such an intermediate space. This also means that the phrase cannot describe the particularity of semiotics: there are a lot of other "interdisciplinary perspectives". So, at the very least, something needs to be added to this definition.

A more sophisticated version of this description is Paul Bouissac's (1998, 1999a, b) claim that semiotics is mainly involved with "meta-analysis", which "consists in reading through a large number of specialised scientific publications, selected among the published literature in one or several domains of inquiry, and of relating the partial results within a more encompassing model than the ones that are held by the various specialists concerned" (1999a, p. 4). This is indeed something which semioticians tend to do; but so do of course a lot of people working within cognitive science and a lot of other purportedly "interdisciplinary perspectives". We are still left with the question of what the specificity of semiotics is. It cannot lie in that "more encompassing model", for we have seen that semiotics is more than a model, since it makes use of a lot of them. Of course, it may contain a class of more wide-ranging models. But in order to contain models, it must be something else: a discipline or, at least, a cognitive tradition.

So what, then, is the central framework provided by a semiotic "meta-analysis"? Not simply the postulated concept of sign, as Eco suggests. I would be the first to agree with Bouissac (1998) that the notion of sign is insufficiently defined in semiotics. In fact, I have often argued that both the central traditions, the Peircean as well as the Saussurean, simply presuppose the essential components of the sign (see Sonesson, 1989, 2010b). Contrary to Bouissac, however, I think the concept of sign makes perfectly good sense, once it has been properly defined (see below). Itself a fruit of meta-analysis, my definition abundantly refers to ontogeny, as well as to phylogeny. However, this does not mean that the concept of sign is sufficient to define the domain of semiotics, which has to be much wider, at least because signs cannot be treated independently of a wider concept of meaning.

Indeed, to inverse the proposition, semiotics cannot be defined by the sign concept. Bordron (2012; following true Greimasean orthodoxy) affirms that semiotics only comes of its own when the concept of sign is superseded, having recourse instead to the kind of homologies posited by Lévi-Strauss, and Bertrand and Canque (2012) find homologies between language and biology simply postulating two binary relationships having a correlation. On the other hand, most scholars outside or at the margin of semiotics (such as George Roque, 2012) take for granted, in their comparisons of semiotics to other disciplines, that the sign is what defines semiotics. It seems that it has never occurred

to anyone (apart from the present author) that the sign, suitably defined (which would imply a definition which would certainly have to include language but also some other kinds of meanings, such as, pictures and at least some gestures), may be a particular kind of meaning, leaving other (and, at least, partly, ontologically and phylologically earlier) meanings to be defined. Outside of semiotics proper, of course, both Piaget and Vygotsky would seem to maintain such a view, and, rather more implicitly, it also seems to be corroborated by the work of more recent psychology and anthropology, such as, for instance, the work of Michael Tomasello (1999, 2008) and Merlin Donald (1991, 2001).

2. From Ontology and Epistemology to *Magisterium*

The most neutral way of looking at semiotics is as a tradition consisting of problems posed and solution proposed which together form a series of entangled strains of problem areas making up a continuous discussion running through the centuries (see Sonesson, 1989, I.1). Philosophy is made up of such tangles, and now and then some part of such a tangle is taken out of the mesh and made into its own particular strain, which is then called a science or a discipline. From an epistemological point of view, nothing changes. This research tradition would still be characterized by its peculiar point of view. And it would not be equivalent to a "doctrine of signs". It would be much more like a discussion: a network of problems branching out ever further through the centuries. In the following, when I talk about semiotics as a science, it should be understood in this sense. Indeed, I would like to claim that a science is simply a research tradition, in the above-defined sense, which has been institutionalized within society (see Sonesson, 2008). It must not follow, however, that the division of the sciences is entirely arbitrary.

2.1 The division of sciences as the division of the world

So far, I have tried to characterise complex notions such as method, model, movements, and so on, in very simple terms, sufficient to rule out the possibility of semiotics being one of those things. Now we face the even more daunting task of trying to determine what a science is. As a first approximation, one may want to say that a science is *a particularly orderly and systematic fashion for describing and analysing or, more generally, interpreting a certain part of reality, using different methods and models*. At this point we may want to introduce a division between natural sciences, on the one hand, and social and human (or, better, semiotic) sciences, on the other, which, following a traditional hermeneutical conception echoed by Eco (1988, p. 351), separates the interpretation of facts from the interpretation of interpretations. Normally, it is added that the first kind of knowledge involves phenomena for which laws may be formulated, while the second kind only refers to unique occurrences; and that while the second type may be understood, the first can only be explained. As we will see, this is largely a pre-semiotic conception.

In some ways, the division of sciences is artificial, to the extent that the division of reality is. Social phenomena may be separated from psychic phenomena, but at some

point they will inevitably overlap. And yet it makes sense to say that there are central phenomena which are specifically social or psychic. In the same sense, some phenomena may be importantly semiotic, while at the same time partaking of the nature of social and/or psychic phenomena. According to this view, there really is only one world, in which everything is continuous, although there may be clusters of characteristic properties forming prototypes, which slowly fade into other characteristic properties. If the hermeneutic view propounded by Eco is correct (and I think it is, at least to some extent), there are really two worlds, however: that of facts, and that of interpretations. And if we take a phenomenological standpoint, the world of interpretations is primary. It is the Lifeworld, the world taken for granted. In this sense, all the human and social sciences are continuous, as is the world they study, and so are the natural sciences, although their continuity is such in reference to another world, the constructed world of the natural sciences. Ecological physics is part of the Lifeworld; physics as a science is part of the other world.

None of this means that the division of the sciences is arbitrary. French structuralism tended to interpret Saussure in a positivist manner, when saying, for instance, that it is the point of view which creates the object. It should be clear from Saussure's preoccupation with the issue that he did not take the decision as to what objects were the objects of linguistics to be arbitrary. On the contrary, he wanted to fix the attention of linguistics on the central cluster of linguistic properties. One may argue that he failed to do so in a proper way, as Chomsky more unambiguously failed to do later on. But that does not mean he set the task wrongly. The same applies to semiotics in general. There certainly are specifically semiotic phenomena. Whether they deserve a discipline of their own is a different matter. It is essentially a matter decided by society at large.

2.2 The division of sciences as the division of points of view

But there is something seriously wrong with this analysis, even at its earliest stage. Not all sciences appear to have their own reserved piece of reality to study. It seems to me that sciences may be defined either as being preoccupied with a particular domain of reality, or as applying a particular point of view to the whole of reality (which is really one and the same). Thus, French studies are involved with French language and literature, linguistics with all languages (or what is common to all languages); similarly, the history of religion describes a very particular domain of reality, religion, as it evolves through history (and pre-history). Even within the natural sciences, there are some sciences that have their particular domains, such as geography, astronomy, and meteorology. This seems to be even more obviously true of such applied sciences as medicine and dentistry.

But there is no semiotic domain, just as there is no psychological or sociological one: rather, everything may be studied from the point of view of its semiotic, as well as its psychological, or sociological, properties. The very term "point of view" is of course a visual metaphor. Yet the point, which is a standpoint, matters more than the sense modality. We find the same thing in the natural sciences: chemistry and physics

often appear to be different points of view taken on the very same matter. This is not the whole truth: in fact, semiotics, psychology and sociology only apply their points of view to the human world, or at least to the world of living beings (in most cases, to animals, not to plants). So the point-of-view approach is supplemented by a domain approach. The domain of chemistry and physics is much wider: its goes well beyond the human world. But both apply the same point of view to the human world and what lies behind it, which is impossible for semiotics, as well as for psychology and sociology. Contrary to chemistry and physics, biology is not just another point of view, but it is also domain-specific: it only involves living creatures. This may explain why there is now such a speciality as biosemiotics but not (at least I hope so) any chemical semiotics.[2]

In the following, then, semiotics will be taken to be a science, the point of view of which may be applied to any phenomenon produced by the human race or, more widely, by living beings. This point of view consists, in Saussurean terms, in an investigation of the point of view itself, which is equivalent, in Peircean terms, to the study of mediation. In other words, semiotics is concerned with the different forms and conformations given to the means through which humankind believes itself to have access to "the world". *Mutatis mutandis*, this formula also applies to all other animals.

Taking the point of view of the users, and trying to explain their particular use, we cannot, like the philosopher Nelson Goodman (1968), reject the folk notion of picture because of its incoherence, but must discover its peculiar systematicity. But it does not follow, as Prieto (1975a) would claim, that we must restrict our study to the knowledge shared by all users of the system, for it is necessary to descend at least one level of analysis below the ultimate level of which the user is aware, in order to take account of the presuppositions underlying the use of the system. Here we must be more Prietean than Prieto, pursuing the parallel with linguistics, according to which phonemes, and even phonological features, although normally unavailable to consciousness, explain the phenomena experienced. Semiotics must go beyond the standpoint of the user, to explain the workings of such operative, albeit tacit, knowledge that underlies the behaviour constitutive of any system of signification (see Sonesson, 1989, I.1.4).

Moreover, semiotics is devoted to these phenomena considered in their *qualitative* aspects rather than the *quantitative* ones, and it is geared to rules and regularities, instead of unique objects. This is to say that, pictorial semiotics, like all semiotic sciences, including linguistics, is a *nomothetic* science, a science which is concerned with generalities, not an *idiographic* science, comparable to art history and most other traditional human sciences, which take as their object an array of singular phenomena, the common nature and connectedness of which they take for granted. I would like to insist on this combination here, since it overrides the traditional divide between the humanities and other sciences, postulated by the hermeneutical tradition from Wilhelm Dilthey and Max Weber to Jürgen Habermas and Karl-Otto Apel: even a well-established semiotic discipline such as linguistics, including the study of any particular language, involves the setting up of laws and regularities, not individual facts. Just like linguistics, but contrary to the natural

sciences and to some varieties of the social sciences, all semiotic sciences are concerned with qualities, rather than quantities – that is, they are concerned with categories more than numbers. Thus, semiotics shares with the social and natural sciences the character of being a law-seeking, or nomothetic, rather than an idiographic, science, while retaining the emphasis on categories, to the detriment of amounts, which is peculiar to the human sciences.

At this point, then, we could say that a science, as well as being a particularly orderly and systematic fashion for describing and analysing or, more generally, interpreting a certain part of reality, might also be *a systematic way of pursuing a number of problems emerging from a particular point of view taken on reality as well as the solutions given to these problems and the new problems resulting from these solutions*. In this sense, semiotics is certainly a science.

2.3 Semiotics in between the human and the natural sciences

In the small article on which rests Ernst Cassirer's (1972, p. 91) principal claim to being a pioneer of semiotics, he declares that "linguistics is part of semiotics, not of physics". This, however, is all he has to say about semiotics. The bulk of the text is taken up by a much more classical discussion: whether linguistics is to be considered part of the *Geisteswissenschaften* or the *Naturwissenschaften*. Here Cassirer refers back to the first *Methodenstreit* in the German philosophy of science, where thinkers such as Wilhelm Windelband and Heinrich Rickert argued that, while the first division of disciplines is concerned to study individual facts and elucidate their history, the second division is dedicated to the formulation of laws and general rules. In other terms, the humanities are ideographic, and the natural sciences are nomothetic. It is more or less taken for granted that while the latter works by generalization and abstraction, the former are limited to telling stories. Thus, the humanities are historical sciences.[3]

Cassirer, however, has learnt the lesson of the Prague school of semiotics well: he quotes Nikolaj Trubetzkoy's opposition between phonetics which is concerned with material facts, such as sound vibrations, or the movement of the speech organs, and phonology which is concerned with "incorporeal things", that is, as Cassirer (1972, p. 90) points out, with units determined by meaning. Not only the segmentation of the world, but also that of the outer form of language, depends on a "world-view": it is the effect of the double Saussurean cut through two amorphous masses, those of thought and sound. Phonology, then, and the whole of linguistics, is a *Geisteswissenschaft*. More importantly, however, Cassirer observes that, in this whole methodological struggle (that is, the work of Wilhelm Dilthey, Wilhelm Windelband and Heinrich Rickert), "the fact that there is such a thing as human speech and that there is such a thing as linguistics was never mentioned" (1972, p. 89). He does not hesitate to qualify this as "a very regrettable fact, a sin of omission that could not fail to have its consequences". Nowadays, it may be added that, as linguistics has now been generalized to a series of particular semiotic sciences, such as pictorial semiotics, gesture studies, cultural semiotics, and so on, the result of neglecting these domains of study in the theory of knowledge is even more dire.

Strange to say, linguistics and other semiotic domains, as particular kinds of epistemological practices, were still ignored in the middle of the 20th century, during the new *Methodenstreit*, in the works of Hans-Georg Gadamer, Jürgen Habermas, Karl-Otto Apel, Niklas Luhmann and others. In fact, many of these thinkers (as is also true of Dilthey) attribute much importance to language in other respects (as does, for instance Habermas, with his ideal speech situation), and yet they do not take the peculiarities of the semiotic sciences into account. They fail to realize that linguistics, and other semiotic sciences conducted on this model, do not really correspond to either the description of the natural or the cultural sciences.

Unfortunately, Cassirer himself does not seem to take this peculiarity into account. In another publication, which is specifically dedicated to the study of the nature of the cultural sciences, Cassirer (1942, pp. 63ff.) takes exception to the simplistic opposition usually proposed between the natural and cultural sciences, claiming that general concepts are needed also in the latter. He starts out exemplifying this with linguistics which, in Wilhelm Humboldt's terms, studies the differences between the varying inner language forms, such as languages, like many Indo-European ones, which distinguish masculine, feminine and neutral gender in the nouns, and those which separate noun classes according to other criteria. He then goes on to discuss art history, exemplifying its general terms with Heinrich Wölfflin's opposition between the picturesque and the linear style. However, if we consider linguistic research as it is really conducted, it is very different from art history, even supposing that thinkers like Heinrich Wölfflin and Alois Riegl had had more success in introducing their general concepts to the discipline as it is really practiced. Whether linguistics is concerned with universals of language (mentioned by Cassirer, 1972, p. 83, with reference to Roman Jakobson), or it simply has the aim of formulating the phonological, grammatical and semantical rules of a given language, it is involved with something general, not with individual facts. Even as analysis of conversation (the Saussurean "linguistique de la parole"), linguistics is interested in formulating general rules. Historical linguistics, which may still have appeared as a more important part of linguistics in Cassirer's time, is certainly involved in a sense with singular facts, such as the dates at which certain language changes occur. But even in the pioneering days of Jakob Grimm and Hermann Paul, historical linguistics was very much dedicated to formulating rules of language change. Art history, even in the radical version of Wölfflin, only uses general facts as regulatory concepts for the studies of individual items. That is why art history is not pictorial semiotics.

Cassirer (1942, p. 65) may, however, be right in claiming that the general concepts involved in the cultural sciences are neither nomothetic nor ideographic, in the sense often given to these terms. They are not nomothetic, he says, because in the cultural sciences, individual phenomena cannot be deduced from general laws. And they are not ideographic, because they cannot be reduced to history. This is of course the distinction I have tried to account for in distinguishing the nomothetic and qualitative sciences of semiosis from the nomothetic and quantitative sciences of nature (see Sonesson, 1989, 1993, 1994).

2.4 On two or three different magisteria

The term "magisterium" is employed by the Catholic Church to identify the authority with which it establishes its authentic teachings. Inspired in the encyclical of Pope Pius XII, the biologist Stephen Jay Gould (1997, 2000b) has generalized this term, in order to describe the different domains over which science and religion hold sway. A magisterium, in this sense, is "a domain where one form of teaching holds the appropriate tools for meaningful discourse and resolution" to the exclusion of any other: that is, the magisteria are non-overlapping. According to Gould, the principle of non-overlapping magisteria (NOMA) reads as follows: "Science tries to document the factual character of the natural world, and to develop theories that coordinate and explain these facts. Religion, on the other hand, operates in the equally important, but utterly different, realm of human purposes, meanings, and values—subjects that the factual domain of science might illuminate, but can never resolve." Emphasizing the legitimacy of each field of endeavour within its appropriate area of inquiry, Gould observes that the principle cuts both ways, religion being barred from treating the domains over which science holds authority, as well as vice-versa.

Unlike Richard Dawkins and his lot, I have no quarrel with this distinction. However, in a much later book, Gould (2003, p. 156) employs the same reasoning with respect to the discrimination between the natural sciences and the humanities. It is not clear whether he means to suggest that religion and the human sciences share the same magisterium, or whether they are two different non-overlapping magisteria, beside the one of the natural sciences. We know, if not from this book, then from his earlier writings, that he does not identify the natural sciences with religion. Not only does Gould's description of "science" in the earlier book suggest that he (as is normal in English, though not in many other languages) restricts the term to the rational description of nature ("the natural world"), but his characterization of the domain of religion as involving "human purposes, meanings, and values" could at least in part apply also to the humanities. It seems to me that one of the problems with contemporary humanities consists in the fact that they commingle two different magisteria, one which is identical or similar to the magisterium of science, in Gould's sense, and another which borders on the realm of religion. Semiotics, I submit, should take over the first of these magisteria.

At least for the last couple of thousands of years, religion can be conceived as a magisterium, where authority emanates from some sacred book (the Bible, the Torah, the Koran), and, secondarily, from the comments made on the content of these writings through the centuries (the writings of the Church fathers, Popal encylicals, Luther's cathesism, the Talmud), and the task set within such a tradition consists in establishing the correct text and the way it should be understood. It is no accident that the origins of philology and hermeneutics in the Occident have two sources: the care devoted to the ancient Greek and Roman classics (which orginated in late Antiquity), and that given to the Biblical text (see Gusdorf, 1967, 1988). In both cases, the fundamental undertaking was the establishment of an authoritative text, and the authorized interpretation of it. It

could be said that much of the humanities has been concerned with the establishment of authoritive texts and their sanctioned interpretation, as applied to the national literature, or world literature, and similarly to recognized paintings, pieces of music, and so on. When authority could no longer be derived simply from revelation, the history of the texts would have to take on that part, and thus the humanities became very much the historical sciences. This is the way the traditional humanities function even to this day, but the model has also been adopted by disciples of some particular thinker, whether it happens to be Marx, Peirce, or Derrida. In the spirit of Gould, I am not claiming that this is not a task worth accomplishing. But it is a different task from what we now associate with scientific inquiry.

But there has always been more than this to the humanities. To paraphrase Gould, the humanities try to document the factual character of the cultural world, and to develop theories that coordinate and explain these facts. Semiotics, I maintain, is an attempt to assemble these strands of humanistic thinking into its own magisterium, parallell to Gould's scientific magisterium at the level of its ambition to elucidate the world as it is, but different in that it aims to describe the world as it is experienced by human (and, more generally, living) beings, that is, as carrying meaning, some elements of which are no doubt purposes and values, but as described rather than reinstated. I do not think the latter distinction is absolute, however. Like Husserl, Cassirer and Habermas, I do believe that, at a metalevel, that is, because of its very formulation, the knowledge gained by human beings on human creativity may itself be enlightening and liberating (see Sonesson, 2009).

When talking about the humanities here, I take these to comprise also what is nowadays known as the social sciences, contrary to what Habermas (1968a, b, 1970) would have done, when opposing the self-reflection and emancipation, closely associated, but not identified, with the humanities, to the instrumental rationality of the social sciences, whose results he takes to be geared to the direct application of social engeneering. No doubt, the social sciences have often played that part, and so have, at least to some extent, the traditional humanities, but they are not bound to do so. The human sciences, in the sense of George Gusdorf (1967, 1988, etc.), who pursues the story line of their intelletual history, embrace not only what we nowadays call the humanities and the social sciences, but also biology and medicine. This sets the stage for cognitive semiotics.

3. On the Way to Cognitive Semiotics

The term "cognitive semiotics" has been used in recent decades by several scholars, apparently without there being any direct influence, to designate an area of research that combines theories, terms, and findings from classical semiotics and cognitive science, including those disciplines which make the latter up, such as philosophy, psychology, linguistics, and biology, with some inspiration from other parts of the humanities and the social sciences (cf. Sonesson, 2007a, b, 2009; Zlatev, 2011). In this sense, cognitive semiotics is subject to several different interpretations, which, however, are more or less

compatible. For the finer details, however, we will here rely on the Lund conception of cognitive semiotics, which, starting out from Thomas Daddesio's (1994) observation, that semiotic structures cannot be studied without also taking into account semiotic abilities, and adding to this the caveat that the connection between mental structures and abilities which are not specifically semiotic needs to be made, has recourse to phenomenological analysis, on the one hand, and experimental studies on the other. Both phenomenology and experiments may seem to be ways of approaching abilities, rather than structures, but, in fact, the relationship is much more complex. I will indeed suggest that they may be used to approach both structures and abilities. In fact, the whole point of making semiotic, rather than only psychological, experiments, is to account for structures, which are ordinarily ignored in psychology.

3.1 Beyond autonomous linguistics and semiotics

To say that something becomes a science because of social reasons is not to suggest that those reasons are necessarily superficial, the result of power games and nepotism (See Hull, 1988). In the case of semiotics, it may simply be the case that semiotics has so far failed to demonstrate its usefulness to wider groups within society. However, society as such is certainly also at stake: for some reason, the fortune of semiotics has been very different in Latin, and in particular Latin American, countries, from that in the Anglo-Saxon, and more generally Germanic, world. People in the latter part of the world would no doubt tend to think that this is so because Latin culture is more susceptible to intellectual fads. There may be some truth in this, if semiotics is identified with intellectual fashion statements such as structuralism, post-structuralism, and post-modernism. However, there can be no doubt that, considered with the necessary distance, the "Anglo-Saxon" cognitive world is equally subceptible to intellectual fads, though perhaps more dependant on economic than intellectual causes. In any case, this is a very limited, and uninteresting, way of looking at semiotics.

The idea of autonomous linguistics, as conceived by Saussure, is basically misguided, as I wrote in one of my first articles (Sonesson, 1979), at least if it is not seen as no more than a first step, before taking into account psychological and sociological facts ("the theory of substance" in Hjelmslev's parlance), but it amounts to a real paradox, when this conception is transferred to semiotics, the whole point of which is to determine the similarities and differences between distinct semiotic resources. In fact, without neglecting formal analysis, I have incorporated knowledge from other sciences from the start into my own semiotic account, in particular, of course, in my work on iconicity generally and the semiotics of pictures in particular (Sonesson, 1989, etc.), in the case of which cognitive and perceptual psychology turned out to be particularly relevant. Others have done so, too, of course: one of the two or three single greatest contributions to pictorial semiotics, the *Traité du signe visuel* by Groupe μ (1992), is certainly very much indebted to perceptual psychology, in spite of some phrases at the beginning swearing allegiance to autonomous semiotics. Others have gone further in using the experimental techniques

of psychology, within pictorial semiotics, René Lindekens (1976) and Martin Krampen (1983), notably. If semiotics has generally been afraid of trying out its hypotheses in the laboratory, then that certainly has a lot to do with its immanentist heritage. Letting loose semioticians in the laboratory (as we already do here at CCS in Lund) would seem to be the final step required for realising cognitive semiotics.

Thus, I have recently discovered that, like a second Monsieur Jourdan, I have been doing cognitive semiotics all along, without knowing it (see Sonesson, 2009, p. 108; 2012a). But unlike Monsieur Jourdan, now that I know what I am doing, I would like to understand it better.

3.2 Meta-analyses in our time: Semiotics and cognitive science

It might be useful here to contrast semiotics with another brand of "meta-analysis" which has met with more luck in the contemporary world, at least in the sphere under Anglo-Saxon influence: cognitive science. Like semiotics, cognitive science is often conceived as an interdisciplinary perspective that sometimes (no doubt more often than semiotics) has gained the position of an independent discipline. Curiously, it might be argued that cognitive science and semiotics cover more or less the same domain of knowledge—or rather, to apply the observations made above, take a very similar point of view on the world. This in itself is controversial, since semiotics and cognitive science offer very different characterizations of their domain (or, strictly speaking, the point of view taken on the domain). In some sense, however, both are concerned with the way in which the world described by the natural sciences appears to human beings and perhaps also to other animals and some robots. Cognitive science puts the emphasis on the place of the appearance of this world, the mental domain (although some of its exponents would not even recognize the mind as such, but would rather talk about the brain and/or the computer), and on its characteristic operation, cognition; and semiotics insists on the transformations that the physical world suffers by being endowed with meaning. Indeed, in an earlier phase, cognitive science seemed more susceptible of being described by a simple model: the mind as computer. At present, however, even cognitive science has several models, one of which could be described as involving the mind as brain.

The disciplinary history of these two approaches has been very different. Cognitive science is often described as the result of joining together the knowledge base of rather disparate empirical disciplines such as linguistics, cognitive psychology, philosophy, biology, and computer science. Thus, instead of one research tradition connected through the ages, cognitive science represents a very recent intermingling of several research traditions having developed separately until a few decades ago. Semiotics has, in a more classical way, developed out of the amorphous mass of philosophy, and still has some problems encountering its empirical basis. It might be suggested that the basic concept of semiotics is the sign, whereas that of cognitive science is representation—even though there is a long tradition in semiotics for rejecting the sign concept, and recent cognitive science has marked its distances to the notion of representation.[4] From the point of view

of methods, semiotics is generally speaking stuck between the analysis of single "texts" and theory construction, whereas cognitive science is closer to relying on experimental methods (including, of course, computer simulation). These differences may partly explain why semiotics and cognitive science rarely are on speaking terms. They may also explain why cognitive science has had so much more institutional success than semiotics: experimental methods are (rightly) appreciated, unfortunately also when they lack theoretical depth; and computer stimulation seems to make science share in the prestige of the machine, in particular the "thinking" machine, in our time.

It does not make sense nowadays to invoke "cognitive science" as a whole. Cognitive science can be practiced, and indeed has historically been practiced, from very different points of views. There is some paradox to the very name "cognitive science", because its initial aim was to do away with cognition, and indeed consciousness, as we know it. Indeed, the fact that mental life could be simulated on a computer was supposed to show that mental notions could be dispensed with altogether. Consciousness was, in this view, not in any way more difficult to explain than the possibility of having snippets of code making the same, or similar, kind of calculations as the human brain. Jerry Fodor's (1987) argument for the "language of thought" is the most explicit version of this point of view. And this conception is still very influential within cognitive science in the form of Daniel Dennett's (1987) idea about the "intentional stance": that human beings simply work like computers, with the added twist that they, for no useful reason at all, happen to think they are conscious.

At some point, some researchers within the cognitive science tradition realized not only that human beings could not really function outside the context of a human life world, and without taking their bearings on their outside bodily form, but that this was true also of computers able to simulate or accomplish some of the operations typical of human beings. This brings us to the notion of "situatedness", which has henceforth played an important role in cognitive science, and also to the complementary notion of "embodiment". Too much should not be made of these notions, however, because, as mentioned above, they apply to computers as well as to human beings. It is no doubt true that they served to bring inspirations from phenomenology and other traditions involved with consciousness into the fold of cognitive science, which is in itself a remarkable feat, if we remember that, before that, many phenomenologists, such as most famously Hubert Dreyfus, and a notable representative of the British style of the philosophy of mind such as John Searle, were violently opposed to cognitive science. However, both situatedness and embodiment can be given—and have been given—other, more mechanistic, interpretations. The preoccupations with notions such as agency, intentions, consciousness, empathy, intersubjectivity, etc., are typical of "consciousness studies", such as practiced, for instance, by Evan Thompson (2007), Shaun Gallagher (2005), Dan Zahavi (2003) and a few others, but not of cognitive science as a whole. In fact, these notions are anathema to much of cognitive science, both in its classical version and, in a more implicit and confused way, in what nowadays may be described as mainstream cognitive science, associated with the work of Lakoff and Johnson, Dennett, Fodor, Hutto,

the Chuchlands, etc.[5]

To Lucy Suchman (1987) and her followers, the term "situated" expressed a need to take the context into account. So does of course the term "embodiment", since our own body is the primary context of all our actions. "Embodiment" is no doubt a more precise term than "context", and perhaps "situadedness" can be made to be that too, but then it has to be specifically defined. In any case, even if "situated" and "embodied cognition" are fashionable terms at present, mainstream cognitive science still does not seem to take them in the direction of consciousness studies. The body which forms the context is not the body as lived, that is, as a meaning, but the body as studied in the neurosciences. Lakoff, Johnson, Rohrer, and their likes today form the core of what is meant by mainstream cognitive science. Although their work is extremely confused and contradictory (as shown most clearly by Haser, 2005), and even though it contains superficial references to part of the phenomenological tradition, a close reading of, in particular, their most recent publications, shows that in actual fact, they are back at a conception identical in practice to that of classical cognitive science, with the brain being substituted for the computer. As soon as they get down to business, the body they are talking about is reduced to the neurons and synapses of the brain. Thus, embodiment, in this tradition, is certainly not part of context. This is also true if their work is interpreted in terms of the kind of influence they have had.

Another related problem derives from the term "cognitive" as such, as it appears in the name of the enterprise. In the traditional discipline of cognitive psychology, and in the psychology of development, as, for instance, in the Piaget tradition, the term "cognitive" has a rather clear, well circumscribed meaning, being opposed, notably, to perception, unconscious processes, and probably empathy in most senses of the term. At least prototypically, or as a goal state, it involves rational operations, such as those that are characteristic of argumentation or problem solving. Although I am not aware of any explicit definition of the term within cognitive science, it is clear that the term "cognitive" here has taken on a much vaster, or much more unclear, meaning: originally, it corresponded to everything which could be simulated by a "cognitive device" such as a computer, and nowadays, it appears to stand for anything which can be localized in the brain. According to the "language of thought" hypothesis (first formulated by Fodor), even categorical perception and other elementary perceptual operations are based on cognition. Contemporary representatives of cognitive sciences such as Lakoff and Johnson would seem to claim that also thinking in a more traditional sense might be reduced to very simple operations, in which case "cognitive science" becomes a misnomer.

If meta-analysis consists, as Bouissac (1999a, p. 4) suggests, in synthesising a great amount of scientific publications from different fields, cognitive science, by definition, has been better at this than semiotics, because it is characterized by the confluence of various earlier research traditions, whereas semiotics has too long been hampered by the autonomy postulate, taken over from Sassurean and Chomskyan linguistics. Unlike most of the venerable semiotic tradition, I have always argued against the autonomy postulate,

basing my own work to a large measure on an interpretation of experimental results (most notably in Sonesson, 1989). In that sense, without using the term, I consider myself to be one of the initiators of cognitive semiotics. However, in some respects, scholars such as René Lindekens and Martin Krampen, who already in the heyday of structuralism set up their own experimental studies, basing themselves on semiotic models, may have even more claim to that title. What cognitive science needs, however, is to take into account even more research traditions, one of which is no doubt semiotics. However, meta-analysis taking a semiotic as well as a cognitive point of view might perhaps better be called simply semiotics. In the end, there may be no meaning without cognition, and no cognition without meaning, at least given the wide definition of cognition characteristic of cognitive science. It might perhaps be said that semiotics differs from cognitive science simply by putting the emphasis on meaning rather than cognition.

3.3 Cognitive semiotics as a new paradigm

Cognitive semiotics—or, perhaps better, semiotic cognitive science, as Terrence Deacon (2014, p. 95) has suggested—, which aims to bring together the knowledge base and models of cognitive science and semiotics, seems to have been invented several times over, probably because it is needed. What seems to be lacking, most of the time, in semiotics, is real empirical research. What is severely missing in cognitive science is a conception of meaning.

The kind of cognitive science with which I here would like to organize an encounter is mainly the brand whose real epistemological horizon is phenomenology, in its classical Husserlean form as well as in its recent versions within consciousness studies—including Searle, whose version of the philosophy of mind is to a large extent either crypto-phenomenological or a parallel development arriving at the same general conclusions.[6] But it is also the kind of cognitive science which continues the tradition of cognitive psychology from Bartlett to Neisser. It is the kind of cognitive science which also relies on experiment.

Semiotics would have nothing to offer cognitive science, if it were only a model or a method, or a philosophical standpoint. Above, I have argued that semiotics cannot be considered to be some kind of method, a model, a particular philosophical tradition, or even an "interdisciplinary perspective", whatever that may mean; nor is it simply, in Paul Bouissac's (1999) term, a "meta-analysis"; but it must be taken to be a science in its own right—or at least an intellectural tradition ready to be reinstated as a science when the social conditions are right. The most obvious reason for this is, as we saw it, that semiotics, if it is not erroneously identified with French structuralism, can be seen to have been using many different models and methods, as well as being practiced from different philosophical points of view. And it is not simply a "meta-analysis" or some other kind of "interdisciplinary perspective", because that does not tell us anything about its originality. It is interdisciplinary and meta-analytical with a twist, because it takes meaning as its perspective on the world.

On the other hand, there have recently been some encouraging developments

within cognitive science which, no doubt with some exaggeration, may be qualified as a "semiotic turn": an interest in meaning as such, in particular as it has developed, ontogenetically and, in particular, phylogenetically, in the human species and, to some extent, in other animals and animal-like machines. Terrence Deacon (1997) is a researcher in neuroscience whose work has been particularly acclaimed within cognitive science. Yet he has chosen to express some of his main arguments in a terminology taken over from Peirce, who is perhaps the principal cultural hero of semiotics.[7] Not only Deacon, both other scholars interested in the specificity of human nature now put their emphasis on the concept of sign (which they normally term "symbol", using this word in a sense in which we will not employ it here). This is true, in a very general sense, of Merlin Donald's (1991) stages of episodic, mimetic, mythic and theoretical culture. It seems to apply even more to Micahel Tomasello (1999), less, in the end, because of his epigraphs taken from classical semioticians such as Peirce and Mead as well as Bakhtin and Vygotsky, than because of the general thrust of his analysis, which consists in separating true instances of interpreting actions as intentional from those which may merely appear to be such. Building on the aforementioned works, Jordan Zlatev (2002, 2003) is explicitly concerned with the conditions for the emergence of higher levels of meaning involving "mimesis" and language, from more basic ones, characteristic of all biological systems (life forms), such as "cues" and "associations".

Interestingly, there has also been an attempt at a true "cognitive science turn" in semiotics, most clearly represented by Thomas Daddesio (1995), who has, however, not created any true following. Daddesio does try to absorb the empirical knowledge base of cognitive science into semiotics, and he does seem to side with the consciousness studies strand in cognitive science, at least in some passages, though he mistakes Lakoff & Johnson for its representatives. His main argument for having recourse to cognitive science, however, seems somewhat confused to me: when he criticizes semiotics for leaving out mental concepts, he puts on the same level the physicalist reductionism of behaviourism and the recognition, on the part of the tradition of Saussure, Cassirer, Husserl, the Prague school, and others, that there is also a third level of meaning, the social or intersubjevtive one—which does not exclude the mental world as its mode of access.[8] The latter, contrary to the former, makes use of semiosis in the most central sense of the term: the intersubjective structures which render meaning possible. In many other ways, however, Daddesio's contribution has been undeservedly neglected. In fact, he is of course quite right in emphasizing the correlation of intersubjective structures (language as Saussurean *langue*) and subjective access (language as "competence", not in the sense of Chomsky but in that of psycholinguistics). If meaning and cognition (in the very general sense of cognitive science) are connected, then semiotics and cognitive science, as we suggested above, may simply be different emphases attributed to the same field of study.

Dadessio has pinpointed one of the transcendences which have to be integrated into semiotic immanence, the subject, or the mind. The other one is no doubt society. Unfortunately, Dadessio confuses the inclusion of society with the exclusion of the

mind, behaviourism and social semiotics. Others have however already insisted on the mostly social character of semiosis. In spite of his formalism, Saussure also said that semiotics (his semiology) should be a part of social psychology. The Prague school argued for the foundation of semiosis on social structures. The Tartu school took up the relay. Vygotsky, besides evolution and development, singled out socio-cultural history. Many contemporary scholars inspired by Vygotsky's example, such as James Wertsch, Chris Sinha, and Jaan Vasinger, have continued in that vein. This is an important part of semiotics, which has been somewhat neglected by professional semioticians.

In this article, I have tried to articulate a somewhat complex stance: the world (or at least the Lifeworld) is continuous, and the scientific disciplines are discrete, and yet the division of the sciences is not entirely arbitrary. There are clusters of properties at the centre of interest of each domain, and even the points of view taken on the world are structured as a thematic field, with its theme, its neighbouring terms, and its margin. The world is indefinitely contextual, but the context is just another text.[9] In other words, each discipline has its central issues, but they cannot be treated out of context. This may sound much like pragmatics, but it is not. Pragmatics is the idea that language is always at the centre, and everything else is supplementary or ancillary. It ensures that only language is properly studied, and the rest is left as it is. The result is, in Yeshoua Bin-Hillel's work, a pragmatic waste-basket. A semiotic approach, in my view, would instead permit the focus, and thus the environing thematic field, to shift from language to gesture or pictures, and so on.

In the second place, pragmatics as linguistic philosophy is not a socially inspired view of semiosis (Cf. Sonesson, 1999, 2007a, b). Like most of Anglo-Saxon philosophy, linguistic philosophy is very much centered on the lone individual. What Austin, Grice, Searle and the others are involved with is the speaker and his intentions. Searle, it is true, has come a long way from his beginnings as a speech act theorist. But even the "we intentionality" of his recent works seems essentially wedded to an individualist view of the world. Such a view would seem to correspond to society as Saussure's "parole", inspired, it is often said, by Gabriel Tarde's idea of society as conversation. But there is something more to society. If Saussure's "langue" derived from Durkheim, then it has to do with society as something outside of the individuals and putting restraints on them (see Juan, 2015). Cognitive science has rediscovered this kind of society under the name of "distributed cognition". While this term may seem to be ambiguous between the Durkheim and the Tarde ideas of society, Salomon (1997) has reintroduced the distinction between the kind of thinking done by people in conjunction and partnership with others and that which occurs with the help of culturally provided tools and implements, such as calculators or grocery lists. Indeed, the first kind, which he calls "shared cognition", is exemplified by conversation where there is a constant change of cognition based on the other person's responses. The second kind is called "off-loading". One would do well to distinguish also a third kind, the system of language, the system of arithmetic, the system of writing, and so on, which make the second kind of objects possible. These are the kind of socially organized meanings recognized by Durkheim and Halbwachs, as well as by

Husserl and Cassirer. Some aspects of this idea (but not the social aspects) reappear in Deacon's "semiotic constraints" (cf. Sonesson 1999, 2007a, b).

The idea of society as (also) being a set of constraints would seem to fit well with the idea of the social contract, prefigured in the contract of the Greimasean deep structure, as well as in the autobiographic pact. But we have of course long known that the social contract is a fiction. There never was a consensus to obey Leviathan. Under these circumstances, it is understandable for François Jost (2012) to suggest the promise as a better model. But a promise is also a social construct, with the difference that it presupposes social normativity, instead of creating it. In some societies, such as Europe, a promise is really meant to create an obligation to which the one pronouncing the promise is bound. In many Non-occidental societies, the promise does not have any time perspective at all; it rather underlays the general rule of being as nice and as agreeable as possible to somebody at the given moment at which the promise is pronounced. These are real world differences not taken into account by the pragmatics of Austin or Searle. Perhaps the "promises" of the media with which Jost is concerned are really like these latter kinds of promises. An even better description is no doubt that which Jost quotes as originally ascribed to publicity: that it is really monological, but has an appearance of being dialogical.

But this cannot account for all of social normativity, which starts out, even today, well before the first media experience, in the crib. I think here we will have to return to the inspiration of the Prague school, which described norms as being of all kinds, from the simple custom to the rule of law and everything in between.

Where semiotics puts the emphasis on meaning, cognitive science, as we have seen, focuses its attention on cognition (however widely redefined). However, by using such a term as cognitive semiotics, I am clearly implying that semiotics is not just any tradition worthy of taking into account in a reformed cognitive science. Such a term clearly involves taking for granted that meaning is the primary issue of human beings and, beyond that, of all life-forms. From the point of view of semiotics, cognitive semiotics is rather a perspective from which semiotics may be elaborated. Without semiotics, cognitive science is not complete.

3.4 Three modes of access and three kinds of phenomena

Even though general semiotics must feature meta-analysis in an essential way, it should not be viewed as simply a tradition within philosophy. As Peirce said, we have to get out of the philosophical soup shops. Nevertheless, let us now turn to consider some of the philosophical residue left in the tureen. Daddesio would thus seem to associate semiotics with a particular philosophical standpoint. But this is a point of view which cannot be sustained. As I argued above against Eco (1988, pp. 323ff.), the fact of there being different semiotical points of view can hardly be taken to demonstrate that semiotics is a particular branch of philosophy; for, at the very least, this would show that semiotics is a class of different philosophical and/or scientific activities. However, as we saw above, it

would be even more natural to conclude that, just like sociology, psychology, archaeology, literary history, and so on, semiotics can be practiced from the point of view of different philosophical conceptions. Thus, there may be a structuralist semiotics, a nominalist semiotics, a phenomenological semiotics, and so on—just as there may be, for instance, a processural and a post-processural archaeology, a positivist and a post-modernist art history, and so on. The kind of semiotics which I propose, which would permit us to organize an encounter with cognitive science of the consciousness studies brand, in particular, is a decidedly phenomenological and empirical semiotics.

Experiments are useful in many ways, but they are also "messy". First of all, they construct artificial situations, which is the only way of rendering possible the variation of factors independent of each other, in order to observe their consequences in the real world. But, no matter how much we worry about ecological validity, the experimental situation is always more or less artificial. In the real world, everything has a tendency to come together, in big, intricate chunks. This is why we need the free variation in the imagination, which defines phenomenology, both in order to pick out the features that are worth submitting to the artificial variation characteristic of experimental studies, and to make sense of the results of these experiments. When talking about phenomenology, I always refer to the work of Husserl and his followers, although Peirce used the same term, at first, to describe an essentially identical endeavour. As I have shown elsewhere (Sonesson, 2009, 2013), the operations of these two approaches are essentially the same, the Peircean restriction to threefold division making it into a special case of Husserlean phenomenology.[10]

But this is not all. The real world (which, in the following, we will call the *Lifeworld*, with a term taken from Edmund Husserl) does not consist only of an environment which resists us and which we resist (according to the double characterization of Secondness described by Peirce), but also of other subjects, who also may resist us as well as assisting us, but in subtler ways. This is why I will follow Jordan Zlatev (2009) in postulating three different kinds of methods, which all need to be used, first-, second-, and third-person methods. Without distancing myself theoretically from Zlatev, however, I would like to apply the distinction between the three persons both to methods (or modes of access) and structures (that which is studied), at the same time leaving out other complications. This gives the table below (Table 1), in which the three persons are brought to bear on each other and themselves, rather like in Peirce's conception of the categories.[11]

Together with my colleagues, I have realized several empirical studies concerned with things like the ages when children acquire indexical and iconical signs, how far apes are able to imitate actions from static pictures as well as from seeing the whole sequence of actions to be imitated, and the differential understanding of seeing the same thing in perceptual reality, by means of directly transmitted video, by means of pre-recorded video, and using a mirror image (Zlatev et al., 2013; Lenninger, 2012; Hribar et al., 2014; Sonesson & Lenninger, 2015). All the studies were preceded and prepared by phenomenological reflection.

Table 1. Three modes of access combined with three kinds of structures accessed

		Phenomena accessed		
Modes of access		First person	Second person	Third person
	First person	Introspection	(Regulated) empathy	Phenomenology
	Second person	"Subjective" description	Dialogue	"Objective" description
	Third person	(External observation)	(External observation)	Experimentation

Following Daddesio's precept, cognitive semiotics attends to both structures (typically described by semiotics and the human sciences) and abilities (typically accounted for by psychology). Moreover, it relates semiotic abilities and structures to other kinds of mental abilities and structures.

3.5 On phenomenology and its naturalization

Just like (French) structuralism was semiotics with a particular epistemological slant, cognitive science so far has often been a study of cognition equipped with a particular epistemology. Basically, French structuralism was characterized by a positivistic conception of the world and of scientific method, taken over less from Saussure than coming out of the subsequent development of linguistics prior to the advent of Chomsky and forming the background of distributionalism and behaviourism. Like all French intellectual fads at the time, structuralism (in this sense) obviously also had to take Freud and Marx into account, which could only be done by tempering the positivist conception, or rather, concomitantly rendering it rigid and inoperant. Something which is less well-known, however, is that structuralism, appearing on the French intellectual scene, also had to define itself in relation to (Husserlean) phenomenology, at least in its French, subjectivist, variety, known as Existentialism. At least the early work of such well-known French structuralists as Greimas, Barthes, and Foucault contains explicit phenomenological references. None of them really reflected on the epistemological incompatibility of phenomenology and positivism (though at least Foucault clearly marked his distances from phenomenology later). Some more recent semioticians, such as Jacques Fontanille and Jean Petitot, have later derived inspiration from phenomenology, although using it less as an epistemology than as a source of inspiration. At the same time, however, semiotics generally has largely grown out of the structuralist straitjacket. This seems to leave it largely orphaned from an epistemological point of view.

From this point of view, cognitive science still seems to remain at the stage of structuralist semiotics. It is a meta-analysis still largely determined by the computer-metaphor, both as a way of constructing models, and (less) as a method of analysis known as simulation. No doubt, while early cognitive science was entirely dependent on the idea

of the mind as a computer, functioning on the model of extant computer programs, recent decades have seen the advent of computer programs, called "neural networks", constructed so as to function as models of the mind, identified with the brain, or at least as models of some aspects of brain functioning. This is perhaps the sense in which Pinker (1997, 2002) suggests that the idea of the mind as computation is wider than the "computer metaphor". At least for some thinkers within this tradition, this has prompted the question of how the mind relates to the brain, or, in other terms, the problem of explaining the "personal level" from the "subpersonal level". Some neurologists within the cognitive science framework have seen the necessity of accounting for "qualia", i.e. the mind as experienced by a subject (Edelman & Tonini, 2000), and philosophers operating within the same frames have tried to map common-sense psychology to brain functioning, often in terms of computer models (Bermúdez, 2005). This should really bring cognitive science closer to phenomenology, even though such a rapprochement has only been suggested in rare instances so far (Gallagher, 2005; Thompson, 2007; Zahavi, 2005). The lack of input from phenomenology and other philosophical traditions current during the turn of the 19th century is clearly apparent in the discussion between "simulation theory" and "theory theory" concerning the relation between Ego and Alter (strange to say, even in Gallagher, 2005).[12]

The task of phenomenology, as Husserl saw it, was to explain the possibility of human beings having knowledge of the world; as a philosophical endeavour, phenomenology is about the way the world of our experience is "constituted". As a contrast, psychology is not about the world, but about the subject experiencing the world. However, every finding in phenomenological philosophy, Husserl claims, has a parallel in phenomenological psychology, which thus could be considered a tradition within psychological science (cf. Husserl, 1962; Gurwitsch, 1974). If consciousness is a relation connecting the subject and the world, then phenomenology is concerned with the objective pole and psychology is about the subjective one. It is often forgotten that Husserl not only inspired but also was himself inspired by the Gestalt psychologists. Close followers of Husserl such as, most notably, Aron Gurwitsch (1957, 1966) and Alfred Schütz (1967) were as much involved with phenomenological psychology as with philosophy and discussed the findings not only of the psychology of perception but of contemporary contributors to neurobiology such as Gelb and Goldstein. Also Maurice Merleau-Ponty (1942, 1945), in his early writings as well as in his seminars (1964), was, in this respect, an exponent of phenomenological psychology.

Being a neurologist, Gerald Edelman (1992) clearly does not discover the body from the horizon of consciousness, like a phenomenologist, but quite the opposite, he implies that the mind cannot be divorced from the body. In a sense, this is hardly controversial: unlike those hypothetical angels postulated by Max Scheler, human beings can only boast a mind as long as they have a body. But, if this is true in the order of existence, it is not necessarily so from the point of view of investigation. After all, Brentano (1885) did not use a scalpel, much less fMRI, to discover the property of intentionality (in the sense of directedness), which Edelman recognizes as an irreducible characteristic of

consciousness; nor did William James (1890) find any of those "Jamesian properties" of consciousness repeatedly mentioned by Edelman in such a way. Indeed, far from being "a deliberately non-scientific set of reflections on consciousness and existence" (Edelman, 1992, p. 159), phenomenology started out from the fact of intentionality and attempted to probe ever deeper into its ramifications, in order to rediscover and amplify those very Jamesian properties of consciousness mentioned by Edelman. Husserl and Gurwitsch may have been wrong to think of phenomenology as a discipline completely separate from biology and psychology, but the relative disconnection of phenomenological reflections, like those of Brentano and James, from biological knowledge has no doubt borne rich intellectual fruit.[13] If "a biologically based theory of mind" can in some respects "invigorate" phenomenology, the opposite is certainly just as true.

It is, first of all, phenomenology in the sense of phenomenological psychology which is of relevance here: it is in this sense that I think that, together with semiotics and cognitive science, phenomenology should participate in the confluence of research traditions making up cognitive semiotics. In the second place, however, phenomenology as a philosophical, and more specifically epistemological, stance may have its part to play. What would it mean for phenomenology, in any of these senses, to be "naturalized", as Petitot (1999, 2012) claims it should be? Phenomenological psychology is already part of the natural world, in the Husserlean sense of the term; and phenomenological philosophy, in one sense, cannot be naturalized, without ceasing to be an epistemological stance; while in another sense, it was already naturalized in Husserl's late work putting the world before the ego and reducing it all to "transcendental intersubjectivity" (see Steinbock, 1995). This common sense world from which all analysis of meaning must start out was characterized by Husserl as the Lifeworld, paraphrased by the later phenomenologist Alfred Schütz as the world taken for granted. The Lifeworld, in this sense, must comprise both what, in recent cognitive science, is known as "naive physics" (what we, as members of the human race, not as students of the natural sciences, believe about the physical world) and "common sense psychology" (what we believe about ourselves and other persons). The psychologist James Gibson (1982), who sometimes repeated Husserl's very words in describing what he called "ecological psychology" (what we must take for granted about the environment in order to be able to perceive the world as we do), is more obviously concerned with the naive physics parts. With his concept of "ecological physics", Gibson certainly brought further the "naturalization" of phenomenology.

What is really meant by "naturalization" of phenomenology, as Petitot's (1999) edited volume makes abundantly clear, is the substitution of experimental, including neuroscientific, methods for those "natural" methods preconized by Husserl. Gibson, of course, also "naturalized" phenomenology in this sense. Another case in point could be Sven Arvidson's (2006) attempt to show the relevance to experimental studies of attention of the phenomenologically derived categories of theme, thematic field (which Arvidson calls contexts), and margin, which according to Gurwitsch divides any possible field of consciousness, perhaps more adequately characterized by Arvidson as the sphere of

attention. Interestingly, he does so in order to show the importance of phenomenology to cognitive science (and thus, even more, I would argue, to cognitive semiotics). The thematic field, according to Gurwitsch, is that part of what is present to consciousness which is connected to the theme of attention in an intrinsic way (itself, as becomes clear in Arvidson's book, a notion which needs elucidation), while the margin is all that is simply co-present (notably the stream of consciousness as a whole in time, the body of the subject, and the world of perception) without being connected to the theme. Arvidson is quite right in claiming that this is an important dimension of consciousness which is neglected in empirical studies, but when he claims that this division is either implicitly present in experimental studies, or would explain their findings better, he is much less convincing. In fact, the experimental studies that he quotes seem to be concerned with other aspects of consciousness, which are at least not sufficiently explained by Gurwitsch's division. Indeed, he often seems to take for granted that "context" (which is Arvidson's term for Gurwitsch's thematic field) is used in the same sense in the experiments by psychologists ignorant of Gurwitsch's work. This goes a long way to show that, if we want experiments to tell us anything about phenomenological (and/or semiotical) notions, we have to design our own experiments.

More direct attempt to harness phenomenology into experimental studies is found in the work of Varela, Gallagher and Thompson. In the case of Varela's neurophenomenology, the subjects undergoing the experimental procedure are trained to use the phenomenological observational techniques on themselves. What Gallagher calls "front-loaded phenomenology" (which could more properly be called phenomenologically inspired experimental studies) derives inspiration from Husserl's work and that of other phenomenologists, in order to design experiments. But rather little seems to have been done along these lines so far.

Gallagher and Zahavi (2008, pp. 28ff.) list another approach to the "naturalization" of phenomenology, using a formal language akin to mathematics, just as in the natural sciences. It is not clear to me why formalization, as such, should amount to "naturalization". The first example given by Eduard Marbach (1993) does not seem to fit this description. Apart from the fact that Marbach's formulas are rather some kind of pseudo-logistics, there is nothing in his book which suggests he does not intend this to be non-naturalized phenomenology. It is true that Marbach (2005, 2007) has elsewhere suggested some rapprochements between phenomenology and ideas derived from cognitive science, but in so doing he has always taken pains to point out that the classical procedures of phenomenology are indispensable for our understanding of the experiments, criticising Dennett's notion of heterophenomenology on the way. The second example, however, is the Centre de Recherche en Epistémologie Appliquée, an interdisciplinary group which includes Jean Petitot, and which explicitly pretends to integrate phenomenology into the natural sciences by translating it into mathematical language. There is nothing wrong with using mathematics (or logic) as a metalanguage for phenomenology. It does not really amount to a "naturalization", at least if the explicit aim is not to make it similar to the natural sciences. But such a procedure cannot substitute for

the phenomenological operations which extract the meaning of consciousness. If it does, we will have, not a "naturalization", but a de-naturalization, in quite a different sense, of the phenomenological method. Indeed, Husserl (1954) famously warned us of taking the mathematization of nature inaugurated by Galileo to be anything else than at "cloth of ideas" cast upon nature. We can throw another (or the same) "cloth of ideas" upon consciousness and meaning. But just like the "cloth of ideas" covering nature, the one covering meaning has to be reanimated by real acts of consciousness.

4. Cognitive Semiotics as Diachrony

Apart from the autonomy postulate, the second heritage all too often taken over by semiotics from French Structualism is the neglect, and even the rejection of, *diachrony*, or historical studies, in preference to *synchrony*, less perhaps in the precise sense of the description of a given state of something, than as *panchrony*, that is, the account of the temporal invarants or universals of that which is studied. An attentive reader of *Cours de linguistique générale* will discover that Saussure did not say diachrony was irrelevant: that would have been a surprising claim for somebody whose life work fundamentally was accomplished in historical linguistics. He certainly says that synchrony and diachrony are different (so much can be verified in his now discovered note books: Saussure, 2002), and he may have said, as the *Cours* suggests, that synchronical (in the sense of panchronical) study always has to precede the study of diachrony. In fact, his most celebrated study (Sausssure, 1879), the one of the vowel in Proto-Indoeuropean represented by an asterisk, was a historical study, but it would not have been possible without a structuralist (that is, in Saussurean terms, a synchronic) preparation. So it is really the French structuralists, preceded to some extent by Louis Hjelmslev, who rejected history. On the other hand, not only Prague school semiotics, but also some structuralist linguists such as Eugenio Coseriu, fully embraced historical studies.

This is also what cognitive semiotics will have to do. As we have seen, in the traditional conception, history is the core of the human sciences. However, as Stephen Jay Gould (2000a, b, 2002a) has repeatedly observed, history is also essential to the natural sciences, for instance in biology as the study of (natural) evolution, in physics as the study of the origin of the universe, etc. Both the natural sciences and the human sciences therefore consist of both nomothetic and ideographic parts, if all historical facts are taken to be the latter (which they are, to the extent that they are located in space and time). That is, the human sciences as well as the natural sciences allow for both a synchronic and a diachronic study. When applied to semiotic structures, this means that there is a diachrony of the species, preceding the diachrony of historical linguistics, that is, evolution, and a diachrony which repeats with each individual born of the species, in other words, child development. In all cases, we are of course concerned with the diachrony of culture. It may seem that there is nothing new about this: after all, late 19th century anthropology, as epitomised by Johan Jakob Bahoften, Henry Sumner Maine, Edward Tyler, and Lewis

Morgan, is known as "evolutionist anthropology", and, even before that, Enlightenment authors proposed schemes for the evolution (or, as they conceived it, the progress) of the human species, and more recently, the exponents of so-called cultural ecology did something similar. However, as Alain Testart (2012, pp. 10ff.) has demonstrated, not only do these "evolutionists" not invoke in any way the Darwinian notion of evolution, but they do not even posit any mechanism at all for explaining the changes: in fact, like the Enlightenment thinkers, they take this progress, or progression, to be a spontaneous result of history occuring. It is only more recently that there have been more systematic proposals featuring factors of cultural evolution.

4.1 Cultural evolution meets natural evolution

It won't be necessary to discuss in the following whether the subject of evolution is the gene, the organism, the group, or something else (see Sonesson, 2016), since cultural evolution, at least in the last instance, car hardly be anything else than group evolution. Embracing the theory of group selection, Peter Richerson and Robert Boyd (2005) have suggested that "genetic", or, as we will say, natural, evolution is not necessarily as longwinded as is often claimed, and that therefore cultural and natural evolution may both succeed and influence each other. Some examples of this that they mention are human anatomy becoming less robust as an adaptation to the availability of effective projectile hunting weapons, and the modification of the human vocal tract to facilitate the production of spoken language.

Richerson and Boyd (2005) go on to suggest that cultural evolution depends at least in part on the same mechanisms as natural evolution. At first, this would seem to bring us back on familiar ground: the notion of "meme," as a unit of cultural selection, comparable to the gene as a unit of natural selection, first defined by Dawkins (1999a [1978]; cf. Blackmore, 1999). In a later definition, Dawkins (1999b [1982], p. 290) describes the meme as "a unit of cultural inheritance, hypothesized as analogous to the particulate gene, and as such naturally selected by virtue of its 'phenotypic' consequences on its own survival and replication in the cultural environment." Nevertheless, Richerson and Boyd (2005, pp. 69ff.) proceed to reject the notion of "meme" (cf. Boyd & Richerson, 2005, pp. 420ff.), stating two reasons for this decision: First, cultural selection does not involve small, atomic parts like genes, but holistic structures; and, second, culture is not faithfully copied, contrary to genes.

As stated, these critiques do not seem to be as weighty as suggested. As to the first argument, Richerson and Boyd may be right in their surmise that cultural evolution does not proceed in an atomical way, but by means of bigger chunks. Indeed, it might make use of schemas, i.e. hierarchically organised structures of meaning, as suggested by a number of authors from Frederic C. Bartlett (1932) to Teun A. van Dijk and Walter Kintsch (1983). On the other hand, genes would no doubt seem to be biologically atomic, but their content is clearly very complex, as we see from the fact that one gene may determine several features of a person, and one feature may depend on several genes. More to the point, Eva

Jablonka and Marion Lamb (2005, p. 210) observe that the idea of a meme "leaping from brain to brain tells us very little," because cultural features are really reconstructed by individuals and groups, in given social and ecological circumstances.

As for the second argument, genes are not always faithfully copied, but are subject to mutation. Perhaps what Richerson and Boyd really want to say is that genes are expected not to change, whereas our idea of a tradition supposes changes to happen all the time. However, the latter does not seem to be the idea of a tradition in what is often called traditional societies (or even in latter-day hermeneutics). Again, Jablonka and Lamb (2005, pp. 210-213) would seem to offer a better formulation of the difference, when they claim that, unlike genes and photocopies, cultural features are dependent on their specific content (and, it could be added, context) for their transmission: thus, for instance, the child's acquisition of a nursery rhyme will depend on the story told by the rhyme, and its melody, as well as the child's musical talent, and so on. Genes are not that particular about the content and the circumstances.

Another critique of what Richard Dawkins calls "memes" comes from Dan Sperber who has observed that cultural information "don't in general replicate in the process of transmission, they transform", so that, "replication, when it truly occurs, is best seen as a limiting case of zero transformation". Similar to Eva Jablonka, Sperber also notes that "they transform as a result of a constructive cognitive process". But these observations square uneasily with Sperber's proclamation of an "epidemiology of representations".

The essential contribution of Richerson and Boyd (2005), however, is to suggest that, along with a mechanism similar to natural selection, culture also depends on a number of other impacting factors. The cultural evolutionary forces discussed by Richerson and Boyd (pp. 69ff.) are as follows: random forces, decision-making forces, biased transmission, and natural selection.[14] As we shall see, all these forces may be further divided. Nevertheless, let us start with the last type of evolutionary force mentioned by our authors, because it clearly has a different status than the others.

Natural selection is said to determine such changes in the cultural composition of a population that are caused by the effects of holding one cultural variant rather than others. The natural selection of cultural variants can occur at the individual or group level. Here, it would seem, natural selection is not really operating at the same tier as the other factors, but rather is something that may be applied to these factors, and determine their chances of survival; in other words, it is a kind of principle of meta-selection. This idea is explicitly stated by Luigi Luca Cavalli-Sforza (2001, p. 178): "Thus, each cultural decision must pass two levels of control: cultural selection acts first through choices made by individuals, followed by natural selection, which automatically evaluates these decisions based on their effects on our survival and reproduction."[15] Natural selection, as pointed out by Elliott Sober (2008), as well as by Jablonka and Lamb (2005), can apply to anything, including culture, which is subject to innovation (variation), transmission (heredity) and differential multiplication and survival. This would seem to bear out Gould's (2002, p. 59) contention that the "one long argument" which Darwin claims

to be making all through his seminal book is "an attempt to establish a methodological approach and intellectual foundation for rigorous analysis in historical science" overall, although biological evolution is the example given. Actually, the idea that Darwinism is really a general theory concerning the mechanism rendering change possibile, in culture as well as nature, was actually proposed before Gould by David L. Hull (1988, pp. 397ff.), in a book involved with cultural evolution and, in fact, more particularly, with the changes in a particular domain of culture, the history of (biological) sciences.

Before pursuing this discussion, it will be convenient to consider the argument formulated by Testart (2012, pp. 136ff.) that cultural evolution cannot employ the same mechanism as natural evolution. As Testart reminds us, there are two aspects to the Darwinian notion of natural selection: there must be an agent which generates the variations; and then there must also be an agent which selects those variations which are going to survive with the next generation. According to Testart, the former is nowadays known to be genetic mutations, but such exclusive identification does not seem to concord with recent evolutionary theory (see Gould, 2002a; Grene & Depew, 2004; Sober, 2000; etc.). Whatever the case may be, our concern here is with cultural evolution. According to Testart, there are three reasons why the Darwinian principles of natural evolution cannot be generalized for the explanation of cultural evolution: 1) the variations should be brought about independently of their adaptive value: 2) there must be a very large panoply of variations; 3) the variations must be generated in a quite arbitrary fashion. Against this, Testart (2012, pp. 141ff.) claims 1) that human beings never imagine forms that are not at least minimally adapted to the circumstances; 2) that sociocultural changes are rarely choices made out of a large gamut of possibilities; and 3) that sociocultural changes are not arbitrary, because they are always preceded and prepared by other changes.[16] The first point is somewhat relativized by Testart's (2012, p. 40, etc.) repeated observation that sociocultural changes are largely unconsciously engaged in. The truth and the relevance of the second point are not altogether clear. The third point, which Testart exemplifies by all the circumstances that prepared for the French Revolution, however, is important, and we will meet it again in another guise (in 4.2).

The only mechanism that Testart (2012, pp. 98ff.) seems to offer as a substitute for Darwinism (for a whole series of technological, environmental, demographic and other causes) is the borrowing of elements from one culture to another. He makes a lot of the fact that this amounts to a kind of confluence of different trajectories, which is the opposite of the classical tree diagram of natural history which builds through diversification. He seems to forget that hybrid species exist, but it is true that they are often sterile, and certainly less common than borrowing between cultures. Still, borrowing may only embody the principle of variation. It leaves the selection process unaccounted for.

Curiously, when Testart (2012, pp. 271ff.) sets out to explain why certain societies of hunterer-gatherers have discovered agriculture, while others have remained hunterer-gatherers, he traces the difference back to two different practices by means of which a man gains a bride. If the husband has to work for the parents of the bride all his life, he

has no incitement to invent new ways of gaining his subsistence, which will only profit the bride's parents; but if he pays a fixed price for the bride, or works a limited period for the parents in order to obtain her, he has a vested interest in ameliorating his methods of production. That, if anything, would seem to be a recipe for the survival of the fittest.

4.2 Factors in cultural evolution

Apart from natural selection, the evolutionary forces listed by Richerson and Boyd (2005) are all of several kinds. *Random forces* may be divided into two subcategories: first, *cultural mutation*, where the effects are due to random individual-level processes, such as misremembering an item of culture. From a more classical, sociological or hermeneutic, point of view, this seems to be the stuff of which rumours and, more widely, traditions, are made.

Second, there is *cultural drift*, which is the effect caused by statistical anomalies in small populations. For example, in "simple societies," as Richerson and Boyd put it, (meaning, I take it, societies consisting of few members and/or societies without a state, which are often not so simple in other respects) some skills, such as boat building, may be practised only by a few specialists. If all the specialists in a particular generation happen, by chance, to die young or to have personalities that discourage apprentices, boat building will die out. The latter is an example given by Richerson and Boyd, but it should be easy to adduce other examples: thus, following Kuhn's famous suggestion about other scientific domains, structuralist linguistics seems to have died out that way within the tribe known as linguists (see Hull, 1988 for similar examples).

It might be objected, however, that, once we have culture, matters become more intricate: we still have all the books of the structuralists, and we can always start glossing them over again. But, even in "simple societies," it may not be so easy to get rid of boat building altogether, if the terminology is preserved in the language. It might even be said that boat-building cannot disappear as long as boats are around. But, the existence of boats may not be enough to tell you how to make them, that is, to realise reverse engineering—and the same goes for boat-building terminology, which is not necessarily sufficient to mirror tacit knowledge. Thus, for instance, we know that, during the Classical time, the Mayas constructed the pyramids in Yucatán, Chiapas, and Guatemala, but, according to all ethnological testimonies, their latter-day descendants believe they were constructed by some supernatural stripe of dwarfs.[17] Whether it is a question of boat-building, or pyramid-building, nevertheless, having access to a written account (and even a series of pictures), and knowing how to read it, makes all the difference. There is of course also another way in which boat-building, or whatever, may be preserved: as an element of another culture which might be borrowed back.

Next, there are *decision-making forces*, which are the kind of impetus for change that is more familiar to us from ordinary history writing. It also reminds us of Testart's objection to the Darwinist explanation (see section 4.1). Richerson and Boyd describe them all as guided variation and as non-random changes in cultural variants by individuals that

are subsequently transmitted. According to Richerson and Boyd, this force results from transformations during social learning, or the learning, invention, or adaptive modification of cultural variants.

Biased transmission is of three kinds. There is *content-based (or direct) bias*, in the case of which individuals are more likely to learn or remember some cultural variants based on their content. *Content-based bias* can result from calculation of costs and benefits associated with alternative variants, or because the structure of cognition makes some variants easier to learn or remember. This is reminiscent of the schemas determining remembering posited by Bartlett (1934); also, the example given by Jablonka and Lamb (2005, pp. 211f.) of children learning certain kinds of rhymes because of the content appears to be of this kind.

The second kind of biased transmission is the *frequency-based bias*, which Richerson and Boyd describe as the use of the commonness or rarity of a cultural variant as a basis for choice. For example, the most advantageous variant is often likely to be the commonest. If so, a conformity bias is an easy way to acquire the correct variant. This seems to correspond to a lot of factors that have been adduced in social psychology, and perhaps especially mass psychology (Le Bon, Tarde, etc.; see Moscovici, 1985).

There is also *model-based bias*, which Richerson and Boyd describe as the choice of traits based on the observable attributes of the individuals who exhibit the traits. In this view, plausible model-based biases include a predisposition to imitate successful or prestigious individuals, as well as to imitate individuals similar to oneself. This factor seems to overlap with the second one, and again it is reminiscent, in particular, of mass psychology.

Still, a more general point can be made about decision-making forces, somewhat in the spirit of the remark about cultural drift above. The fact that history, contrary to evolution, plays out in the periods of mimetic, mythical and theoretic memory, in Donald's sense of the terms, cannot be neglected. Indeed, it would seem to be the fact that changes the whole game.

4.3 Accumulation before communication

According to Jurij Lotman (1976), the accumulation of information as well as of merchandise (material objects) precedes their interchange and is a more elementary and more fundamental characteristic of a culture than communication. Material objects and information are similar to each other, in Lotman's view, and differ from other phenomena, in two ways: they can be accumulated, whereas, for example, sleep and breathing cannot be accumulated, and they are not absorbed completely into the organism, unlike food, instead remaining separate objects after the reception. Although, at the time, Lotman may well have wanted to play on the ambiguity of the term information in the colloquial sense, and in the sense of the mathematical theory of communication, we will here take it exclusively in the first sense, and thus identify it with meaning, knowledge and even, in its aspect of being accumulated, with memory (cf. Sonesson, 1999, 2010b).

Instead of talking about accumulation, it might be more useful to adopt a term

suggested by Edmund Husserl: the sedimentation of meaning. In posthumous texts, Husserl distinguished between the genetic and generative dimensions of experience (cf. Welton, 2000; Steinbock, 1995). Every object in our experience has a *genetic* dimension: it results from the layering, or *sedimentation*, of the different acts that connects it with its origin, which gives it its validity, in the way in which geometry, as Husserl (1954, pp. 378ff.) observes, derives from the praxis of land-surveying. There is also the further dimension of *generativity*, which pertains to all objects, and which results from the layering, or *sedimentation*, of the different acts in which they have become known, which may be acts of perception, memory, anticipation, imagination, and so on. The term generativity is meant to evoke the idea of generations following each other, as well as the trajectory accomplished by each individual from being born to dying. Taking all this into account, the return to the origin cannot amount to a reduction of geometry to land-surveying, in which case not only non-Euclidean geometry would be impossible, but all the "discoveries" of mathematics after the formalization of the practice of land-surveying. As Husserl (1954, p. 371) goes on to mention, though he fails to bring it into focus, geometry, as well as any other system of ideal structures, appears to have an existence beyond all the practice which is sedimented into them, already because they are present outside of time and space—or rather, in all times and spaces (after the foundational moment, or more precisely, the sequence of foundational moments: see Sonesson, 2015b).

It is important to note that the approach in terms of geneticity and generativity, unlike that preconised by Lotman, supposes accumulation to be a result of communication, and vice-versa.

According to Dan Sperber (1996), sedimented meanings ("public representations") do not have any real existence, because, first, they are only material objects, until they are experienced by psychological subjects, that is, as "mental representations"; and, second, they subsist, and are distributed (and transformed) because they are reproduced as "mental representations": "Public representations are artefacts the function of which is to ensure a similarity between one of their mental causes in the communicator and one of their mental effects in the audience". The first point is true in a way, but the second is not. In the case of systems (cases like "langue"), only the elements of the system (phonemes, letters, even contours in pictures) have to subsist mentally, while their combination is given in sedimented meanings. This also applies to "parole" (books, for instance, whether written or painted), to the extent that they consist of a certain sequence of elements taken from such systems

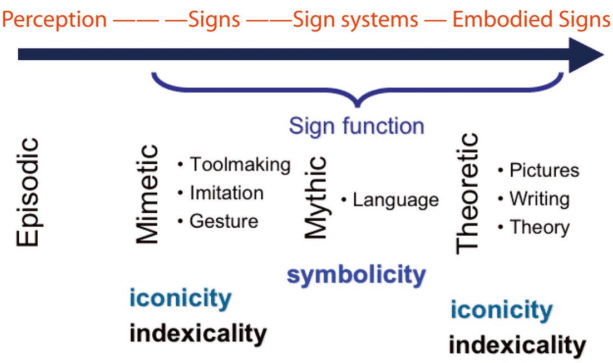
4.4 The cultural production and reproductions of sediments

Neither Lotman nor Husserl offers any typology of such sedimented structures. Merlin Donald (1991, 2001, 2010) does, however, at least in the sense of situating kinds of sedimentation at different phases of evolution, in a sense which includes both natural and cultural stretches of the process. Indeed, he identifies four stages of the evolutionary process by means of which human beings have become different from other animals,

identifying them with different kinds of memory (see Figure 1). *Episodic memory*, the memory for single situated happenings, is something which human beings share with many other animals. *Mimetic memory*, or perhaps rather the peculiar form that mimetic memory takes in human beings, is restricted to human beings and close predecessors, such as *Homo ergaster* and/or *Homo erectus*. Donald's next stage, *mythic memory*, corresponds to language, and would thus already require the ability to use signs. It is called mythic memory, however, because it involves the construction of narratives, no doubt initially used to recount myths, and thought by Donald to be the reason why language evolved. It is in the fourth stage, which Donald calls the *theoretic stage*, that pictures, writing, and theories emerge, all being examples of external memory devices, or as Donald (2010) calls them (in contrast to "engrams") "exograms". The latter would seem to correspond to much of what has been termed "extended mind" in cognitive science (cf. Clark & Chambers, 1998; cf. Clark, 2011).[18]

Whether *episodic memory* is taken to include time travel, as was claimed by Endel Tulving (1983) who fist coined the term, or not, as Donald takes for granted, it is a kind of memory which, in itself, is restricted to the single individual.[19] It is not an inheritance mechanism, in the sense of Jablonka and Lamb (2005), that is, something which conveys properties of one organism to another, as in the case of methylation, natural evolution, and information trasmitted by means of behaviour or signs. As I have pointed out elsewhere, many remarkable things seem to happen within the stage which Donald calls the *mimetic stage*: there is tool use, skill, imitation, gesture, and pantomime, some of which involve sign use and others not (cf. Sonesson, 2007a, b, 2013a, 2016). Again, most of this will not concern us here. However, it might be said that, as long as mimesis only comprehends tool use, which appears to me to be a possible first phase, it is, equally to episodic memory, an individual concern. It is certainly sedimented as a behaviour pattern into the body, but only from the point of view of the individual possessing that particular body. This remains true of skill, as long as it is the skill for using tools or even for using the members of the own body in an instrumental way. Thus, for instance, land-surveying could be seen as one of those cutting-edge skills in its time.

Figure 1. Donald's evolutionary scale, as interpreted by Sonesson (2007a, b)



Once we arrive at imitation, the situation is quite different, for it involves at least two, and most probably numerous, individuals. And when imitation is stabilized in the form of gesture or pantomime, that is, as signs, a community of users appear to be required. If we think of pictures, not as static structures as we are now wont to consider them, but as the sedimented patterns by means of which pictures are produced in the sand, or on the skin, or on any other surface unable to conserve the pattern for long (as the air, in the limiting-case of gesture), pictures might be included into this category, and not into the fourth one, as Donald suggests; but we have no clear historical sources for determining which one of these assignments is correct. The nature of the memory trace may however be modified, starting out on a quite different path from instrumental action, without the movement becoming a sign or even an instance of imitation, if skill in using the members (as in dancing) or other objects (as in acrobatics) loses its instrumental character, and instead acquires a spectacular function, that is, being offered as a spectacle to at least another individual (or, at the limit, to the self, see Sonesson, 2000a).

Table 2. Four kinds of memory according to Donald's scheme, as expanded by Sonesson, 2007a, b and in the present article. In the text, rather than types of memory, we will talk about first to fourth generation sediments of meaning

Type of memory	***Specification***	***Type of sediment***	***Type of embodiment***
Episodic	**I.**	Attention span (event in time/ space)	—
Mimetic	**IIa.** Tool use (including skill in instrumental action	Action sequence available as pattern type	Own body
	IIb. Imitation	Action sequence initiated by *Alter* on the example of *Ego*	From *Ego's* body to *Alter's* body
	IIc. (Mimetic) Sign	Action pattern type co-owned by *Ego* and *Alter*	The bodies of a community of subjects
	IId. Skill in autonomous action (dance, acrobatics, etc.)	Action sequence presented by *Ego* to *Alter*	*Eco's* body (possibly motor sequence in *Alter*'s body)
Mythic	**IIIa.** System	Virtually mind-dependant storage of rules for selection and combination	Presupposed in the co-production by *Ego* and *Alter* of transient artefact normally manifested as sound waves
	IIIb. Narrative structure	Mind-dependant storage of pattern for structures which are temporal and both the content and the expression side	Token realised as sound waves in real time
	IIIc. Tradition	Token which is partly mind-dependant and partly externalised as sound waves or by other semiotic means	Chain of dialogues (trilogues) between *Ego* and *Alter* situated in different but continuous temporal (and possibly spatial) worlds
Theoretic	**IVa.** Canon	Enduring artefact itself permitting the co-externalisation by *Ego* and *Alter* further artefacts	External, but still dependent on relation to *Ego* and *Alter,* first for its existence, and second for its instantiation
	IVb. Exemplars	Type for enduring artefacts permitting the co-externalisation by *Ego* and *Alter* the correspond tokens	External, but still dependent on relation to *Ego* and *Alter,* first for its existence, and second for its instantiation

The third kind of memory, as conceived by Donald, is *mythic memory*, which is most clearly exemplified by language. Much more has been written about this special kind of memory than on any of the others. Ever since Wilhelm von Humboldt, it has been observed, notably by Ferdinand de Saussure, Louis Hjelmslev (1959, 1973), and Eugenio Coseriu (1978), that language can be considered in different ways, some being closer to the consciousnes of the language user, and some of a more systematic and/or collective nature. Karl Bühler (1965 [1934], pp. 38ff.), for instance, notes that language may be conceived as being more subjective or more objective, as well as subsisting at different levels of abstraction, that is, as tokens or types, which, when combined, give rise to linguistic behaviour, which is subjective and at the token-level, linguistic acts, which also are subjective, but on the type-level, linguistic systems, which are objective and at the type-level, and finally, linguistic works (or texts), which are subjective and at the type-level. In recent decades, a school of thought has emerged in linguistics which maintains that language basically consists of "flow" (e.g. Cowley, 2009), but it is really difficult to make sense of such a position (but see below).

Still, there are different ways of conceptualising what Donald calls the mythic stage. If we take the case of language to be prototypical, we will think of this kind of memory as being a system of resources available to all users of the systems, certainly including, apart from the semantic network envisaged by Saussure, some rules for the combination of items, though probably not in the form of generative grammars, or any of its avatars. Although structuralism has tried to hone us into thinking of systems as being disembodied and non-situated, they only make sense when conceived as being social structures, or, in terms of Durkheim and his followers, collective representations, as Saussure also said. On the other hand, if the business of the third stage is that of telling stories and, I take it, originally myths in the proper sense of the term, i.e. stories of gods and the origin of the world, we should think of the third stage as comprising narrative structures, or scripts[20], which is to say that they have a temporal dimension, that is, they are linearly organized, which is true of language, not as a system, but as acts being accomplished. Finally, there is a third possible interpretation of this third stage, which brings us closer to the notion of "flow", or in other terms, orality, rumor, tradition, hermeneutics—all of which are based on dialogues (or trilogues, etc.) being repeating in time and, in the limiting case, through the centuries. This idea gives rise to a powerful image of subjects exchanging views and channelling them on to further generations. The question is, of course, how long such a chain of dialogues may be sustained on its own.

This brings us to the fourth stage, called *theoretic memory* by Donald, which supposes the existence of a physical realisation independant of the bodies of the subjects (except, of course, when the body is used as a surface for conserving meaning, but then of course in a relatively transient way). Again, the name given to this stage by Donald epitomizes one of its possible realisations, that is (scientific) theories, but the stage also comprises writing and pictures (if they are not sand paintings, etc., on which see above). Such a theory, on a very general level, may be geometry, but also the general rules of land-surveying, as

opposed to the simple bodily praxis of which both are "formalizations", according to Husserl's (1954, pp. 365-217) observations in the "Orgin of geometry"-paper. Such a system of rules, conveyed by means of the kind of artefact we call a book, is comparable to the system of the third stage, although now more enduringly embodied. However, a piece of writing, and even a picture (book), is more comparable to the narrative structure type of the third stage.

4.5 Resistances to cultural evolution

The first version of cultural evolution which comes to mind is no doubt one in which the different accumulated meanings of the second, third, and fourth evolutionary stages serve as support for further accretions of evolution. Indeed, this is certainly how one would figure the parallell process of (child) development (see section 4.6). However, I think it will be more instructive to look at a case in which, from the point of view of Occidental history writing, further evolution appears to be hindered by the presence of such accumulated meanings. My example will not be taken from pre-history, because I think we probably do not have access to sufficient facts to conduct an investigation of the kind I envisage. However, to the extent that later stages of prehistory will also contain second, third, and even fourth generation meaning sediments (in the sense of Table 2), similar obserservations apply. I will consider the case of the Spanish conquest of America, as seen by the Spaniards. From the point of view of the taxonomy elaborated by Boyd and Richerson (see 4.2), we are concerned with something similar to *cultural drift* and perhaps also *cultural mutation*, if the latter can be serially produced, the important difference, however, being that these changes, in this precise case, were not essentially random, but the result of *decision-making forces*, often starting high-up in the power structure at the level of imperial policy. Still, the effects, if obtained, would be of the same kind as cultural drift (and perhaps mutation).

There were some things the Spaniards clearly wanted to change in Pre-columbian culture, the most clear-cut exemple being the religious beliefs intrinsic to that culture. After all, the (real or fictive) goal of the whole process was evangelization. The colonizers were less adamant about changing the power structure: in fact, all that they asked, at the beginning at least, was for the existing power structure to move one pigeonhole down, accomodating the Spanish Emperor on the upper rung (as in the famous "requerimento"). On the whole, they were not at all interested in changing the languages spoken by the "indians", except perhaps by using some of the already dominant languages as the language of evangelization (quite coherently, in relation to their view of the power structure). With time, however, it seems that, as Carmen Bernand and Serge Gruzinski (1988) have observed, ever more elements of ancestral culture came to be considered the expression of Pre-Colombian religion, and thus were thought to be deserving of extirpation. What happened then shows that it was thanks to the accumulated meanings of their ancestral culture that the original inhabitants were able to hold their own for several centuries, while also spreading these meanings to mestizo and creole culture.[21]

When first arriving on the Caribbean islands, Columbus was enheartened to find that the natives were devoid of all religion and in fact all kinds of culture, which meant that they could be easily evangelised. The Spaniards were later to find out that that was not entirely true; in fact the natives of the islands had the kind of culture which was not readily visible or, more generally, not given to the senses, except as transient artefacts. In our terms, it was a second to third generation culture (II-III; see Table 2). When later reaching Mexico and the Peru, and being confronted with a very visible kind of culture, consisting of buildings, pictures and, in the former case, picture books which amounted to some kind of writing (IVb), the Spaniards could no longer deny that there was another culture to take into account. In Mexico, they also encountered audible culture, in the form, not only of language systems, as already on the islands, but of systems and applications of rhetoric (IIIa.), and in narrative forms, that took the form of myths (IIIb.). This experience, on its own, may explain that Cortés took a different approach when arriving, and even in preparation for arriving, in the Nahua (Aztec) capital: in Yucatan, he found Aquilar, a Spaniard who had been stranded on an earlier attempt to colonize Mexico, and who, during his captivity, had had the time to learn Maya Yucateco, and he also chanced upon Malintzín, who, being a Mayan woman, spoke the imperialist tongue of the times, Nahuatl, and he took advantage of this discovery to form a chain of interpretation from Spanish, over Maya, to Nahuatl, linguistically, and no doubt also to some extent culturally (see Sonesson, 2000b, 2012b). Contrary to Columbus, Cortés was certainly aware of there being another culture present, that is, in our terms, another series of second to fourth instances of meaning sediment, which had to be thoroughly scrutinized, before any forced cultural substitution could take place. Later on, this technique of thoroughly assimilating the heritage of the other better to extripate it was to be perfected by Fray Bernardino de Sahagún, often hailed as the first anthropologist, because of his protracted and comprehensive attempt to document the whole of Nahua culture, including the specifically religious elements, all with the declared aim to better eradicate it (see Edmonson, 1974; Léon-Portilla, 1987; Wolf et al., 2011; Sonesson, in preparation).

Even so, Cortés could not free himself from the notions taken for granted in his own culture, so once he was able to sneak into the centre of Nahua culture by hermeneutic means, he rendered himself at the centre of that culture—the temples, and ordered all the "idols" to be destroyed. This is exactly the time in which the accumulated meanings of Pre-Columbian culture suffered their first setback. Whatever else they could be described as (and here Spaniards and Nahuas certainly had different opinions), the idols constituted accumulated meaning structures of the fourth generation (IVb). As far as I have been able to find out, no new idols were fabricated as substitutes for those destroyed, but it is known that idols which had survived the first wave of destruction were hidden away (see Bernand & Gruzinski, 1988; Gruzinski, 1988, 1999, 2005.).[22] Another kind of accumulated meaning structures of the fourth generation, however, were the painted book or *codices*, whether we consider them as specimens of writing or pictures. Almost all Pre-Columbian painted books were burnt, not only in the Valley of Mexico but also, famously, by fray

Diego de Landa among the Mayas in Yucatan. Like Bernardino de Sahagún and Diego Durán, Landa was later to regret these destructions, trying to make up for the information lost by collecting information from the natives. Thus they were basicially having recourse to meaning sediment of the third generation, notably by means of interviews with members of the Indian population (IIIa, IIIb, IIIc). There are, however, at the present time, a number of painted books in Pre-Columbian style, many now preserved in Western museums and libraries, but most of them were in fact produced by native artists, after the destruction of the original books (see Robertson, 1959; Boone, 1998). This means that the elements of these books were preserved, after the destruction of the exemplars, in the form of third generation accumulated meanings (IIIa, IIIc) and no doubt also in second generation form, that is, as the tacit know-how of indigenous artists (IIa, IId). As far as we know, this knowledge was not conserved in the form of pattern books, comparable to grammars (that is, as IVa). Some of these books constituted new genres, no doubt created (as we know in some case for a fact) at the order of Colonial authorities, who wanted to reconstruct knowledge of the ancient cultures, mostly better to destroy it in the souls of the indians. Like Sahagún, the authorities imagined to preserve this knowledge in the form of fourth generation accumulated meanings, in order to rid themselves of it in the form of third generation meanings. In the end, the authorities thought that this kind of meaning sediment was dangerous, perhaps even more so for containing written glosses in both Nahuatl and Spanish, making Sahagún's book into a sort of Canon of Pre-Columbian culture (in the sense of IVa) ; the emperor himself ordered the book to be suppressed, if not destroyed (Léon-Portilla, 1987; Bernand & Gruzinski, 1988). However, many of the newly fabricated painted books were not made to preserve the Pre-Columbian heritage in the interest of the new authorities. As Elisabeth Hille Boone (1998, pp. 150f.) observes, while some of the painted books made after the Conquest represent new genres, most of them can be grouped into three broad categories, which contain the genres existing before the Conquest: religious books and guides for living, historical books, and practical documents, and thus can be expected to fulfil the same functions as earlier to the native populations.

Even when the codices were destroyed, or taken away to be conserved in some Occidental museum or library, the sediments of meaning typical of Pre-Columbian society did not entirely disappear. Andrés Mixcoatl in 1537, Gregorio Juan in 1659, Juan Coatl in 1665, and Antonio Pérez in 1761 all claimed to be apostles, and ambiguous incarnations, of the ancient gods, mixing second and third generation meaning sediments of Pre-Columbian orgin with elements assimilated from Christian faith, probably also mostly taken over from second and third generation meanings (see Gruzinski, 2005; Lafaye, 1997)[23]. Moreover, when I said above that no new idols were fabricated, that is only half true. The effigy most similar in its function to a Pre-Columbian idol, the virgin of Guadalupe, appropriating, in many respects, the part of the ancient mother goddess Tonantzin, whose place of devotion it also took over, did not look in any obvious way like a Pre-Columbian idol (see Lafaye, 1974). Even the brown skin colour of the face is

known from earlier incarnations of the virgin in Spain. Nevertheless, in other paintings, more broadly devotional, and in fact realised, like most paintings in Post-Columbian times, on church walls, elements recognizable from the painted books (IVb) abundantly appear, facilated, as Gruzinski (1988, 1999) has observed, by the European fashion of the grotesque style, which required all spaces of the painted surface to be filled up with figures, among which could easily be insinuated elements of Pre-Columbian culture.

4.6 Child development and other diachronies

Child development is a case of bio-cultural co-evolution, if anything, in the general sense in which all change is evolution. More properly, attending to the difference between evolution and development which is customary in this domain, we could describe it as bio-cultural co-development. Unlike the case of evolution proper, child development has been considered in this way for a fairly long time already, in the work of Lev Vygotsky (1952) and his numerous followers around the world. Moreover, Donald's evolutionary scheme was transferred, independently, it would seem, by Kathrin Nelson (2007) and Jordan Zlatev (2007), to child development. Just as in the case of the evolution of the human species, therefore, child development will necessarily come across second to fourth generation sediments, which, whether as obstacles to, or sustenances for, the developmental process, were necessarily produced by other subjects. The difference from evolution, however, is that we are not limited to investigating this process by means of the fossil record, scattered dug-up artefacts, and historical anecdotes. We can make our own experiments.

And this is what we have done. Thus, we have shown that sediments functioning indexically are grasped much earlier by children than those functioning iconically, and while we hypothesised there should be a difference between different kinds of iconic and indexical sediments, this has not so far been proven (Zlatev et al., 2013). In other studies, we have demonstrated that mirror images are as hard for small children to interpret as pre-recorded video strips, both contrasting with the ease shown by the children in interpreting the corresponding perceptual scene and its rendering by live video (Sonesson & Lenninger, 2015; Lenninger et al., submitted). Moreover we have intimated that pictorially formed sediments allow for the identification, also in small children, of objects as depicted in other pictures, well before it affords the possibility of locating the object in perceptual space (Lenninger, 2012). Although our earlier study (Zlatev et al., 2013) showed that only indexical sediments were accessible to apes, we have also demonstrated the the language-trained ape Kanzi was able to interpret pictures (Persson, 2008), and that after "do as I do"-training, another ape, Alex, could identify actions he had been trained on just as well from single photographs as from video clips and perception (Hribar et al., 2014).

Taking another perspective, child development simply consists of a temporal sequence made up of semiotic acts, including those that are only half successful, or not at all. But each one of these acts, just as any semiotic act realised by adults, is itself a

temporal process, which may be temporal all through, as is the case of speech acts, in the literal sense of the term, or they may consist simply in the initiative of putting into place a spatial object or configuration. Thus, in the case of, for instance, some gestures, such as most clearly those that describe a kind of movement (walking, flying, etc.), the whole temporal procedure is relevant to the acts, while in some other cases, most clearly in the case of emblems (for instance the V-sign), the movement only serves to establish a position of the hands or arms which are the relevant part (see examples in Hribar et al., 2014).

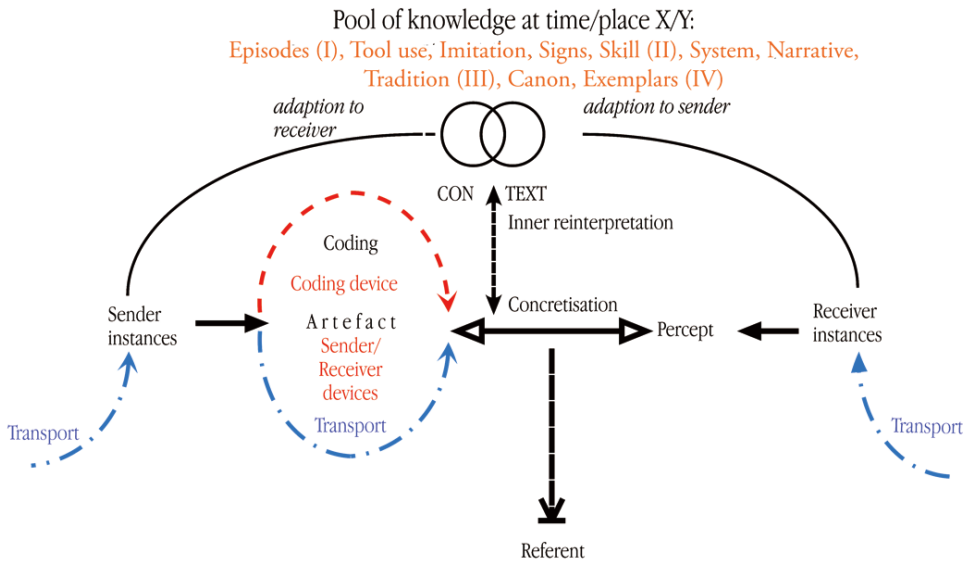
In other words, there is always a diachronic aspect to semiotic acts. It is useful to remember the insight from Humboldt, as well as from Bühler (1965 [1934]), Hjelmslev (1959, 1973), and Coseriu (1978), according to which language, and we may well add any other semiotic resource, can be construed synchronically or diachronically, as the case may be. In its famous theses, the Prague school (1964 [1929]) argued that there was diachrony within synchrony, and synchrony in diachrony. This is normally understood as the rather trivial claim that there is change or dynamics also within a very short slice of time and the much less trivial, and properly structuralist claim, that what changes in time is the structure rather than the single elements, a fact anticipated in Saussure's (1879) study of the Indo-European vowels. But the first part of the thesis may also be given a less commonplace interpretation, according to which, as suggested in the last paragraph, there is a temporal structure to any semiotic phenomenon. Bühler, it will be remembered, distinguished between the act of language ("Sprachakt") and the action of speech ("Sprechhandlung"). In so doing, he anticipated, and corrected, the notion of "speech act" which has been current since the times of Austin and Searle. I think the disparity can be glossed by refering to McTaggard's well-known distinction between time as conceived in the A-series and in the B-series. The act of language (or, more broadly, of semiosis) pertains to the B-series, that is, it involves the stages of before and after. The action of speech (or, more generally, of actual semiosis) pertains to the A-series, or in other words, to the order of past, present and future (see Gell, 1992, pp. 149ff.; Sonesson, 2015a).

Even perception may be conceived as an act or action taking place in time. Microgenesis (or as it was originally known, *Aktualgenese*) involves the brief presentation of a percept, a thought, an object of imagination, or an expression, as a dynamic unfolding and differentiation in which the "germ" of the final experience is already embodied in the early stages of its development (see Rosenthal, 2004; Sonesson, 2013b). Sander and Volkelt (1962), who first observed this phenomenon, noted that if the distance between the occurrence and the "good form" is small, the difference is not observed; next, it will be seen as a not quite perfect example of the configuration in question; and even further from the ideal, it can be experienced as in an equilibrium between two different "good forms". Some signs, like language and pictures, start out as perceptual experience. That is, as token in the stream of consciousness, they occur in A-time. But in order to distinguish language and pictures, as types, we have to situate them in B-time. It is in the latter sense that all semiotic resources are manifested in time and/or space, as "temporal objects" like

linguistic acts, "spatial objects" like pictures, or both, like the theatre and the cinema (see Sonesson, 2014).

According to the Prague school model, as I have interpreted it elsewhere (Sonesson, 1999 and Figure 2), all kinds of communication consist in presenting an artefact to another subject and assigning him or her the task of transforming it by means of concretisation into a percept. This is a generalization of the model of artistic experience proposed by Jan Mukařovský (1970), the main figure of the Prague school of semiotics in the 1930s, but this possibility of generalization is built into the model from the start, since it is based on the phenomenology of Edmund Husserl—or, more exactly, that of his follower Roman Ingarden (1965 [1931]),—but then adds to this a social dimension.

Figure 2. Model of communication inspired by the Prague Tartu model, as proposed by Sonesson (1999) and incorporating some extensions proposed in the present text



Since, to Mukařovský (1970), all communication is social, the process of creating the artefact, as well as that of perceiving it, is determined by a set of norms, which may be aesthetic (and in works of art they would be predominantly so), but they can also be social, psychological, and so on. The work of art is that which transgresses these rules. Mukařovský points out, however, that these norms may be of any kind, going from simple regularities to written laws. We could conclude that there is a continuum from normalcy to normativity, without qualitative divisions being left out.

According to the Prague school model all interpretation also takes place in accordance with a pool of knowledge, more or less shared between the sender and the receiver, which has two main incarnations: the set of exemplary works of arts and the canon, in the sense of the rules for how art works are to be made. Again, this double aspect of the pool of knowledge may be generalized from the special case of art to any artefact offered up for communication. On the one hand, there are certain exemplary artefacts, and, on the other

hand, there are the schemas of interpretation. We can now extend this typology in ways suggested by Table 2, to include, apart from episodes, different kinds of second, third, and fourth generation sediments.

Where does this leave the developing child? Starting out and learning from episodes, some of which are successively sedimented into second and third generation sediments, it then encounters on the way further sediments, set up by parents and teachers, which function as obstacles to begin with, and then, with luck, are turned into stepping stones. *Mutatis mutandis*, this is also how any human life on this earth is staked out.

5. Summary and Conclusions

I started out this discussion, considering what kind of endeavour semiotics might be: since it is certainly not a model, a method, a philosophy, or just any interdisciplinary approach, it must be a discipline or, taking away the social foundation, a research tradition. And if it is a kind of meta-analysis, that is, an analysis applied to other analyses, then it cannot be just any kind, because there are many such approaches, but it must be a meta-analysis geared to the discovery of meaning, here taken to be a broader concept than the sign. This insight prepared us for examining the differences and similarities between semiotics and cognitive science, both of which are no doubt basically meta-analyses. I went on to suggest that semiotics and cognitive science would be better off working together, cognitive science furnishing the empirical approach, and semiotics some of the basic concepts (which is not to say that some others may not be taken over, and revised, from cognitive science and other domains). Then, following, notably, the rich tradition of the Prague school of semiotics, I also contemplated the role of society, and thus of sociology, in semiotics. Finally, I have tried to develop a methodology for the semiotic study of evolution and development, which would resolve on the way the old issue concerning the import of diachrony in semiotics. Discussing some of the factors which have been proposed to account for biological evolution, I admitted their relevance, but claimed that these factors must all the time be up against obstacles or, on the contrary, stepping-stones, made up of the sediments of earlier semiotic acts. This will always be a difference between natural and cultural evolution. After a thorough analysis of evolutionary methodology, I briefly touched on the parallel task of creating a method for studying development. Still, the kind of model required for the latter kind of analysis has already been anticipated in developmental psychology.

This should leave us with a clearer idea of what cognitive semiotics is and could be. But we are still only at the beginning of our journey.

Notes

1 Or, as Steven Jay Gould (2003, p. 156) says: “Each magisterium embraces its own *E pluribus unum*” (see section 2.4).

2 Some semioticians (notably John Deely, 1990, p. 32) have proposed the creation of a

"physiosemiotics", but it remains very unclear what the subject matter of such a discipline could be, except for the physical world as it is perceived and interpreted by human beings and other animals.

3 As we shall see, the problem with this is not only that some natural sciences, as has been pointed out by Gould (1997, 2000a), are historical in nature, such as evolutionary biology and the physics of the origin of the universe; but at least some (parts of the) humanities are concerned to formulate general rules and laws. Indeed, this was precisely Saussure's point in privileging synchrony.

4 If this seems a paradoxical statement, I must refer the reader to Sonesson, 2007a, b, 2010b.

5 My first tradition seems to correspond to what Thompson (2007, pp. 4ff.) calls "cognitivism", but the other two only overlap somewhat with Thompson's "connectionism" and "embodied dynamicism".

6 Interestingly, Smith (2007) counts Searle among the West coast phenomenologists of the US, although Searle himself never mentions Husserl (or practically any other thinker but himself)

7 Without trying in any way to diminish Deacon's contribution—in fact, I find him very convincing whenever he is not having recourse to semiotic terminology—, I have earlier expressed serious misgivings about his way of using Peircean terms, because it serves to obscure both the central issues of semiotics, and those introduced by Deacon (Cf. Sonesson, 2006).

8 I am of course simplifying the issue: thus, there is a notable ambiguity in the work of Saussure between a social and an outright formalist interpretation.

9 Two theses from my dissertation (Sonesson, 1978), which still seem to be relevant.

10 None of this goes to deny that there are many essential differences between Peirce and Husserl on other levels.

11 Unfortunately, when Peirce himself identified the categories with the personal pronouns, the result was hardly compatible with the way we use the three persons above, since the second person is identified with Thirdness. Cf. Singer, 1984.

12 For a discussion of this tradition, which is useful even for those who are not able to agree with the Heideggeran conclusions (curious in this author), see Gurwitsch, 1977 (written in 1931).

13 According to Steinbock (1995), late in life, when taking a non-Cartesian way to phenomenology, Husserl actually preconized the use of knowledge stemming from the positive sciences.

14 To Sperber, random forces are endemics (traditions), and biased transmission is epidemics (fashion).

15 It is not clear, however, why the choices at the primary stage have to be made by individuals, rather than groups.

16 Testart (2012, pp. 88f.) makes a distinction between society and culture, which we do not follow here.

17 In addition, this particular example seems to testify to some additional principle being at play, familiar to the structuralists, according to which the pyramids, being so immense, and so difficult to climb, must be constructed by people even smaller than you and me, who thus have to be supernatural to be able to do it.

18 If this notion is taken to comprise also *distributed cognition*, in the sense of Hutchins (1995), i.e. the airplane cabin or ship doing the thinking together, it certainly also includes mimetic memory/inheritance by means of behaviour.

19 Whether this justifies a distinction between episodic and pre-episodic memory, as I have suggested elsewhere (Sonesson, 2015) is something which we will leave aside at present.

20 As this term is used by Schank and Abelson (1977), it might as well refer to mimetic patterns.

21 As Gruzinski (2012) has shown, the Iberian world powers more or less at the time tried to do the same thing in China, but failed miserably, because Chinese authorities did not let them in, controlling very strictly their commercial access. From another point of view, the fact that China was a recognized culture (even in the fourth generation sense), while Mexico and Peru were quite unknown before they were "discovered", partly may explain the modalities of the encounter, though intrinsic properties of these respective cultures were no doubt also important.

22 According to John Duncan Derrett, quoted by Peter Frankopan (2015, p. 7), Buddha statues were first created in India, after the Greek conquerors had established the cult of Apollo in this part of the world. This is an interesting case of cultural encounters giving rise to fourth generation accumulated meanings, rather than leading to their destruction.

23 Here intervenes the factor borrowing, which, according to Testart, accounts for the specificity of cultural evolution. See section 4.1.

References

Arvidson, S. P. (2006). *The sphere of attention*. London: Kluwer Academic.

Bartlett, F. C. (1923). *Psychology and primitive culture*. Cambridge: Cambridge University Press.

Bartlett, F. C. (1967 [1932]). *Remembering: A study in experimental and social psychology*. Cambridge: Cambridge University Press. (Original work published 1932)

Bermúdez, J. L. (2005). *Philosophy of psychology*. New York & London: Routledge.

Bernand, C., & Gruzinski, S. (1988). *De l'idolâtrie: une archéologie des sciences religieuses*. Paris: Seuil.

Bertrand, D., & Canque, B. (2012). Sémiotique et biologie. *Signata, 2*, 195-220.

Blackmore, S. J. (1999). *The meme machine*. Oxford: Oxford University Press.

Boone, E. H. (1998). Pictorial documents and visual thinking in postconquest Mexico. In E. H. Boone & T. Cummins (Eds.), *Native traditions in the postconquest world: A symposium at Dumbarton Oaks, 2nd through 4th October 1992* (pp. 149-200). Washington, D.C.: Dumbarton Oaks Research Library and Collection.

Bordron, J.-F. (2012). Le discours spéculatif. *Signata, 2*, 13-48.

Bouissac, P. (1998). Converging parallels. Semiotics and psychology in evolutionary perspective. *Theory & Psychology, 8*(6), 731-753.

Bouissac, P. (1999a). *Semiotics and the science of memory*. Paper presented at the Conference on Semiotics and the European Heritage, Dresden, February 1999.

Bouissac, P. (1999b). Le savoir sémiotique. *Degrés*, (100), c1-c15.

Boyd, R., & Richerson, P. J. (2005). *The origin and evolution of cultures*. Oxford: Oxford University Press.

Brentano, F. (1924 [1885]). *Psychologie vom empirischen Standpunkt*. Leipzig: Meiner. (Reprinted 1924)

Bühler, K. (1965 [1934]). *Sprachtheorie: die Darstellungsfunktion der Sprache*. Frankfurt/M: Ullstein.

Cassirer, E. (1942). *Zur Logik der Kulturwissenschaften*. Göteborg: Elanders.

Cassirer, E. (1972). Structuralism in modern linguistics. In B. Malmberg (Ed.), *Readings in modern linguistics* (pp. 78-98). Stockholm: Scandinavian University Books.

Cavalli-Sforza, L. L. (2001). *Genes, peoples and languages*. London: Penguin.

Clark, A. (2011). *Supersizing the mind: Embodiment, action, and cognitive extension*. Oxford: Oxford University Press.

Clark, A., & Chalmers, D. J. (1998). The extended mind. *Analysis, 58,* 7-19. (Reprinted in Clark, 2011)

Coseriu, E. (1978). *Teoría del lenguaje y lingu̇ística general: cinco estudios* (3rd ed.). Madrid: Gredos.

Cowley, S. (2009). Language flow: Opening the subject. *Cognitive Semiotics, 4*, 63-91.

Daddesio, T. C. (1995). *Of minds and symbols*. Berlin & New York: Mouton de Gruyter.

Davies, S. (2012). *The artful species: Aesthetics, art, and evolution*. Oxford: Oxford University Press.

Dawkins, R. (1976). *The selfish gene*. Oxford: Oxford University Press.

Dawkins, R. (1999). *The extended phenotype: The long reach of the gene* (rev. ed.). Oxford: Oxford University Press. (Original work published 1982)

Deacon, T. (1997). *The symbolic species: The co-evolution of language and the brain*. NY: Norton.

Deacon, T. (2014). Semiosis: From taxonomy to process. In T. Thellefsen & B. Sørensen (Eds.), *Charles Sanders Peirce in his own words: 100 years of semiotics, communication and cognition* (pp. 95-104). Berlin: De Gruyter.

Deely, J. (1990). *Basics of semiotics*. Bloomington: Indiana University Press.

Dennett, D. C. (1987). *The intentional stance*. Cambridge, MA: MIT Press.

Dijk, T. A. van, & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York: Academic Press.

Donald, M. (1991). *Origins of the modern mind. Three stages in the evolution of culture and cognition*. Cambridge, MA: Harvard University Press.

Donald, M. (2001). *A mind so rare*. New York: Norton.

Donald, M. (2010). The exographic revolution: Neuropsychological sequelae. In L. Malafouris & C. Renfrew (Eds.), *The cognitive life of things: Recasting the boundaries of the mind* (pp. 71-80). Cambridge: McDonald Institute Monographs.

Eco, U. (1988). *De los espejos y otros ensayos*. Barcelona: Lumen. (Spanish translation of *Suglie specchi e altri saggi*. Milan: Fabri, 1985)

Edelman, G. (1992). *Bright air, brilliant fire. On the matter of the mind*. London: Penguin Books.

Edelman, G., & Tonini, G. (2000). *A universe of consciousness*. New York: Basic Books.

Edmonson, M. S. (Ed.). (1974). *Sixteenth-century Mexico: The work of Sahagún* (1st ed.). Albuquerque: University of New Mexico Press.

Ferraris, M. (2002). *Historia de la hermenéutica*. Mexico: Sigle XXI editores. (Italian original 1988)

Fodor, J. (1987). *Psychosemantics*. Cambridge, MA: The MIT Press.

Frankopan, P. (2015). *The silk roads: A new history of the world*. London: Bloomsbury.

Gallagher, S. (2005). *How the body shapes the mind*. Oxford: Clarendon.

Gallagher, S., & Zahavi, D. (2008). *The phenomenological mind: An introduction to philosophy of mind and cognitive scienc*e. London: Routledge.

Gell, A. (1992). *The anthropology of time: Cultural constructions of temporal maps and images*. Oxford: Berg.

Gibson, J. J. (1982). *Reasons for realism: Selected essays of James J. Gibson* (E. Reed & R. Jones, Eds.). Hillsdale, NJ: Lawrence Erlbaum.

Goodman, N. (1968). *Languages of art*. London: Oxford University Press.

Gould, S. J. (1987). *Time's arrow, time's cycle: Myth and metaphor in the discovery of geological time*. Cambridge, MA: Harvard University Press.

Gould, S. J. (1997). Nonoverlapping magisteria. *Natural History, 106*, 16-22.

Gould, S. J. (2000a). *The lying stones of Marrakech: Penultimate reflections in natural history*. London: Jonathan Cape.

Gould, S. J. (2000b). *Wonderful life: The Burgess Shale and the nature of history*. London: Vintage.

Gould, S. J. (2002a). *The structure of evolutionary theory*. Cambridge, MA: Belknap Press of Harvard University Press.

Gould, S. J. (2002b). *Rocks of ages: Science and religion in the fullness of life*. New York: Ballantine Books.

Gould, S. J. (2003). *The hedgehog, the fox, and the magister's pox*, New York: Harmony Books.

Gould, S. J., & Lewontin, R. (1979). The spandrels of San Marco and the panglossian paradigm: A critique of the adaptationist Program. *Proceedings of the Royal Society of London. Series B, Biological Sciences, 205*, 581-598.

Greimas, A. J. (1970). *Du sens*. Paris: Seuil.

Grene, M. G., & Depew, D. J. (2004). *The philosophy of biology: An episode history*. Cambridge: Cambridge University Press.

Groupe µ. (1992). *Traité du signe visuel*. Paris: Seuil.

Gruzinski, S. (1988). *La colonisation de l'imaginaire: sociétés indigènes et occidentalisation dans le Mexique espagnol, XVIe-XVIIIe siècle*. Paris: Gallimard.

Gruzinski, S. (1999). *La pensée métisse*. Paris: Fayard.

Gruzinski, S. (2005). *Les Hommes-dieux du Mexique: pouvoir indien et société coloniale XVIe - XVIIe siècles*. Paris: Archives contemporaines.

Gruzinski, S. (2012). *L'aigle et le dragon: démesure européenne et mondialisation au XVIe siècle*. Paris: Fayard.

Gurwitsch, A. (1957). *Théorie du champ de la conscience*. Bruges: Desclée de Brouver.

Gurwitsch, A. (1966). *Studies in phenomenology and psychology*. Evanston: Northwestern University Press.

Gurwitsch, A. (1974). *Phenomenology and the theory of science*. Evanston: Northwestern

University Press.

Gurwitsch, A. (1977). *Human encounters in the social world*. Pittsburgh: Duquesne University Press.

Gusdorf, G. (1967). *Les sciences humaines et la pensée occidentale. 2, Les origines des sciences humaines: (antiquité, moyen âge, renaissance)*. Paris: Payot.

Gusdorf, G. (1988). *Les sciences humaines et la pensée occidentale. 13, Les origines de l'herméneutique*. Paris: Payot.

Habermas, J. (1968a). *Erkenntnis und Interesse*. Frankfurt am Main: Suhrkamp.

Habermas, J. (1968b). *Technik und Wissenschaft als "Ideologie"*. Frankfurt am Main: Suhrkamp.

Habermas, J. (1970). *Zur Logik der Sozialwissenschaften*. Frankfurt am Main: Suhrkamp.

Haser, V. (2005). *Metaphor, metonymy, and experientialist philosophy: Challenging cognitive semantics*. Berlin & New York: Mouton de Gruyter.

Hjelmslev, L. (1959). *Essais linguistiques*. Copenhagen: Nordisk Sprog- og Kulturforlag. (2nd ed., Paris: Minuit, 1971)

Hjelmslev, L. (1973). *Essais linguistiques. 2*. Copenhague: Nordisk Sprog- og Kulturforlag.

Hribar, A., Call, J., & Sonesson, G. (2014). From sign to action. Studies in chimpanzee pictorial competence. *Semiotica*, (198), 205-240.

Hull, D. L. (1988). *Science as a process: An evolutionary account of the social and conceptual development of science*. Chicago, IL: University of Chicago Press.

Husserl, E. (1913). *Logische Untersuchungen*. 2., umgearb. Aufl. Halle a.d.S.

Husserl, E. (1939). *Erfahrung und Urtei*l. Prag: Academia Verlagsbuchhandlung.

Husserl, E. (1950). *Cartesianische Meditationen und Pariser Vorträge*. Husserliana I. Haag: Nijhoff.

Husserl, E. (1954). *Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie: eine Einleitung in die phänomenologische Philosophie*. *Husserliana: Gesammelte Werke. VI,* 2. Aufl. Haag: Nijhoff.

Husserl, E. (1962). *Phänomenologische Psychologie*. Husserliana IX. The Hague: Nijhoff.

Hutchins, E. (1995). *Cognition in the wild*. Cambridge, MA: MIT Press.

Ingarden, R. (1965 [1931]). *Das literarische Kunstwerk: Eine Untersuchung aus dem Grenzgebiet der Ontologie, Logik und Literaturwissenschaft* (3rd ed.). Halle: Max Niemeyer.

Jablonka, E., & Lamb, M. J. (1999). *Epigenetic inheritasnce and evolution: The Lamarckian dimension*. Oxford: Oxford University Press. (Original work published 1995)

Jablonka, E., & Lamb, M. J. (2005). *Evolution in four dimensions: Genetic, epigenetic, behavioral, and symbolic variation in the history of life*. Cambridge, MA: MIT Press.

Jakobson, R. (1960). Linguistics and poetics. In T. Sebeok (Ed.), *Style in language* (pp. 350-377). Cambridge, MA: MIT Press.

James, W. (1890). *The principles of psychology*. (Republished 1950, New York: Dover Publications)

Johnson, M. (1987). *The body in the mind*. Chicago & London: University of Chicago Press.

Johnson, M., & Rohrer, T. (2007). We are life creatures: Embodiment, American pragmatism, and the cognitive organism. In T. Ziemke, J. Zlatev, & R. Frank (Eds.), *Body, language, and mind*

(pp. 17-54). Berlin & New York: Mouton de Gruyter.

Jost, F. (2012). Pour une sémiologie des médias. *Signata, 2*, 139-154.

Juan, S. (2015). *L'école française de socioanthroplogie*. Auxerre: Editions Sciences Humaines.

Kendon, A. (2004). *Gesture: Visible action as utterance*. New York: Cambridge University Press.

Krampen, M. (Ed.). (1983). *Visuelle Kommunikation und/oder verbale Kommunikation?* Hildesheim: Olms.

Lafaye, J. (1974). *Quetzalcóatl et Guadalupe: la formation de la conscience nationale au Mexique (1531-1813)*. Paris: Gallimard.

Lafaye, J. (1997). *Mesías, cruzadas, utopías: el judeo-cristianismo en las sociedades iberoamericanas* (2nd ed.). México: Fondo de Cultura Económica.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh*. New York: Basic books.

Lakoff, G., & Turner, M. (1989). *More than cool reason*. Chicago/London: University of Chicago Press.

Lenninger, S. (2012). *When similarity qualifies as a sign: A study in picture understanding and semiotic development in young children* (Doctoral dissertation). Lund: Lunds Universitet.

Lenninger, S., Persson, T., & Sonesson, G. (submitted). Do two year old children use information from video and mirror images to find a hidden object? The factor of contiguity in young children's perception of reference in primary iconic signs.

León Portilla, M. (1987). *Bernardino de Sahagún*. Madrid: Historia 16.

Lindekens, R. (1976). *Essai de sémiotique visuelle: le photographique, le filmique, le graphique*. Paris: Klincksieck.

Lotman, J. M. (1976). Culture and information, Dispositio. *Revista hispánica de semiótica literaria, 3*(1), 213-215.

Luckman, T. (1980). *Lebenswelt und Geschichte*. Paderborn: Schöning.

Marbach, E. (1993). *Mental representation and consciousness: Towards a phenomenological theory of representation and reference*. Dordrecht: Kluwer Academic Publishers.

Marbach, E. (2005). On bringing consciousness into the house of science—With the help of Husserlian phenomenology. *Angelaki, 10*(1), 145-162.

Marbach, E. (2007). No heterophenomenology without autophenomenology: Variations on a theme of mine. *Phenomenology and the Cognitive Sciences, 6*(1), 75-87.

Maturana, H. R., & Varela, F. J. (1987). *The tree of knowledge: The biological roots of human understanding*. Boston: Shambhala.

Merleau-Ponty, M. (1942). *La structure du comportement*. Paris: PUF.

Merleau-Ponty, M. (1945). *Phénoménologie de la perception*. Paris: Gallimard.

Merleau-Ponty, M. (1964). Merleau-Ponty à la Sorbonne: resumé de cours. *Bulletin de psychologie*, 235, XVIII: 3-6, 109-336.

Moscovici, S. (1985). *L'âge des foules: un traité historique de psychologie des masses* (2 èdition). Paris: Editions Coplexe.

Mukařovský, J. (1974). *Studien zur strukturalistischen Ästhetik und Poetik*. München: Hanser.

Mukařovský, J. (1978). *Structure, sign, and function: Selected essays*. New Haven, CT: Yale University Press.

Nelson, K. (2007). *Young minds in social worlds: Experience, meaning, and memory*. Cambridge, MA: Harvard University Press.

Peirce, C. S. (1931-1958). *The Collected papers of Charles Sanders Peirce* (Vols. 1-8) (C. Hartshorne, P. Weiss, & A. W. Burks, Eds.). Cambridge, MA: Harvard University Press. (Quoted as CP)

Peirce, C. S. (1998). *The essential Peirce* (Vols. 1-2) (Peirce Edition Project, Eds.). Bloomington: Indiana University Press.

Persson, T. (2008). *Pictorial primates*. Lund: Lund University.

Petitot, J. (Ed.). (1999). *Naturalizing phenomenology: Issues in contemporary phenomenology and cognitive science*. Stanford, Calif.: Stanford University Press.

Petitot, J. (2012). The morphodynamical turn of cognitive linguistics. *Signata, 2*, 61-80.

Piaget, J. (1945). *La formation du symbole chez l'enfant*. Neuchatel: Delachaux & Niestlé. (3rd ed. 1967)

Piaget, J. (1966). *La psychologie de l'intelligence*. Paris: Armand Colin.

Piaget, J. (1970). *Epistémologie des sciences de l'homme*. Paris: Gallimard.

Pinter, S. (1997). *How the mind works*. New York: Norton.

Pinter, S. (2002). *The blank slate*. London: Penguin.

Prague school. (1964 [1929]). Thèses présentées au Premier Congrès des philologues slaves. In J. Vachek (Ed.), *Travaux du Cercle linguistique de Prague 1* (pp. 5-29) (Reprinted in *Prague School Reader in Linguistics*, 33-58). Bloomington: Indiana University Press.

Prieto, L. (1966). *Messages et signaux*. Paris: PUF.

Prieto, L. (1975a). *Pertinence et pratique. Essai de sémiologie*. Paris: Minuit.

Prieto, L. (1975b). *Essai de linguistique et sémiologie générale*. Genève: Droz.

Richerson, P. J., & Boyd, R. (2005). *Not by genes alone: How culture transformed human evolution*. Chicago, IL: University of Chicago Press.

Robertson, D. (1959). *Mexican manuscript painting of the early colonial period: The Metropolitan schools*. New Haven: Yale University Press.

Roque, G. (2012). Sémiotique visuelle et histoire de l'art. *Signata, 2*, 121-138.

Rosenthal, V. (2004). Microgenesis, immediate experience and visual processes in reading. In A. Carsetti (Ed.), *Seeing, thinking and knowing. Meaning and self-organisation in visual cognition and thought* (pp. 221-243). Berlin: Springer.

Salomon, G. (1997). *Distributed cognitions: Psychological and educational considerations*. Cambridge: Cambridge University Press.

Sander, F., & Volkelt, H. (1962). *Ganzheitspsychologie*. München: Verlag C. H. Beck.

Saussure, F. de. (1879). *Mémoire sur le système primitif des voyelles dans les langues indo-européennes*. Leipsick: Teubner.

Saussure, F. de. (2002). *Écrits de linguistique générale*. Paris: Gallimard.

Schank, R., & Abelson, R. (1977). *Scripts, plans, goals and understanding: An inquiry into human knowledge structures*. Hillsdale, N.J.: Erlbaum.

Schütz, A. (1967). *Collected papers. 1, The problem of social reality* (2., unchanged ed.). The Hague: Nihoff.

Singer, M. (1984). *Man's glassy essence: Explorations in semiotic anthropology.* Bloomington: Indiana University Press.

Smith, D. W. (2007). *Husserl*. London: Routledge.

Sober, E. (2000). *Philosophy of biology* (2nd ed.). Boulder, Colo.: Westview Press.

Sober, E., & Wilson, D. S. (1998). *Unto others: The evolution and psychology of unselfish behaviour*. Cambridge, MA: Harvard University Press.

Sonesson, G. (1978). *Tecken och handling*. Lund: Doxa.

Sonesson, G. (1979). A plea for integral linguistics. *Papers from the 5th Scandinavian Conference of Linguistics, del II*, ss, 151-166. Stockholm: Almqvist & Wiksell International.

Sonesson, G. (1989). *Pictorial concepts. Inquiries into the semiotic heritage and its relevance for the analysis of the visual world*. Lund: ARIS/Lund University Press.

Sonesson, G. (1993). Die Semiotik des Bildes. *Zeitschrift für Semiotik, 15*, 131-164.

Sonesson, G. (1994). Prolegomena to the semiotic analysis of prehistoric visual displays. *Semiotica*, (100), 267-332. (Special issue: Prehistoric signs, edited by Paul)

Sonesson, G. (1996). An essay concerning images. From rhetoric to semiotics by way of ecological physics. Review of Groupe μ, Traité du signe visuel. *Semiotica*, (109), 41-140.

Sonesson, G. (1997). Approaches to the Lifeworld core of visual rhetoric. *Visio, 1*(3), 49-76.

Sonesson, G. (1999). The signs of life in society – and out it. S*ign System Studies, 27*, 88-127.

Sonesson, G. (2000a). Action becomes art. "Performance" in the context of theatre, play, ritual – and life. *VISIO*, 5, 2, Automne 2000: Les arts de l'action/Action Art, van M. Mechelen & G. Sonesson (Eds.), 105-122.

Sonesson, G. (2000b). Ego meets Alter: The meaning of otherness in cultural semiotics. *Semiotica*, (128), 537-559.

Sonesson, G. (2006). The meaning of meaning in biology and cognitive science. A semiotic reconstruction. *Trudy po znakyvym sistemam—Sign Systems Studies, 34*(1), 135-214.

Sonesson, G. (2007a). From the meaning of embodiment to the embodiment of meaning. In T. Zimke, J. Zlatev, & R. Frank (Eds.), *Body, language and mind. Vol 1. Embodiment* (pp. 85-128). Berlin: Mouton.

Sonesson, G. (2007b). The extensions of man revisited. From primary to tertiary embodiment. In J. Krois, M. Rosengren, A. Steidle, & D. Westerkamp (Eds.), *Embodiment in cognition and culture* (pp. 27-56). Amsterdam & Philadelphia: Benjamins.

Sonesson, G. (2008). Beyond methods and models. Semiotics as a distinctive discipline and an intellectual tradition. *Signs - International Review of Semiotics*. Retrieved from http://vip.iva.dk/signs/Articles_Signs_International_Section/Soneson%20(2008)%20Beyond%20methods%20and%20modelsNNgs1%20(2).pdf

Sonesson, G. (2009). The view from Husserl's lectern. Considerations on the role of phenomenology in Cognitive Semiotics. *Cybernetics and Human Knowing, 16*(3-4), 107-148.

Sonesson, G. (2010a). Rhetoric from the standpoint of the Lifeworld. *Nouveaux Actes Sémiotiques: Le Groupe μ. Quarante ans de rhétorique – Trente-trois ans de sémiotique visuelle*. Retrieved from http://revues.unilim.fr/nas/document.php?id=3324

Sonesson, G. (2010b). Semiosis and the elusive final interpretant of understanding. *Semiotica*, (179),

145-258.

Sonesson, G. (2012a). Semiotics inside-out and/or outside-in: How to understand everything and (with luck) influence people. *Signata, 2*, 315-348.

Sonesson, G. (2012b). Between homeworld and alienworld: A primer of cultural semiotics. In E. W. B. Hess-Lüttich (Ed.), *Sign Culture – Zeichen Kultur. Festschrift for Roland Posner* (pp. 315-328). Würzburg: Königshausen & Neumann.

Sonesson, G. (2013a). The picture between mirror and mind. From phenomenology to empirical studies in pictorial semiotics. In K. Sachs-Hombach & J. R. J. Schirra (Eds.), *Origins of pictures—Anthropological discourses in image science, Chemnitz, March 30-April 1, 2011* (pp. 270-311). Köln: Halem Verlag.

Sonesson, G. (2013b). Aspects of 'physiognomic depiction' in pictures. From macchia to microgenesis. *Culture & Psychology, 19*(4) *Special issue on Werner and Kaplan's Symbol formation, 533-547*. Sage Online Editions. Retrieved from http://cap.sagepub.com/content/19/4/533

Sonesson, G. (2014). Translation and other acts of meaning. In between cognitive semiotics and semiotics of culture. *Cognitive Semiotics, 7*(2), 249-280.

Sonesson, G. (2015a). From remembering to memory by way of culture. A study in cognitive semiotics. *Southern Journal of Semiotics, 5*(1) *Special issue: Memory as a representational phenomenon*, 25-52.

Sonesson, G. (2015b). Phenomenology meets semiotics: Two not so very strange bedfellows at the end of their Cinderella sleep. *Metodo, 3*(1), 41-62.

Sonesson, G. (2016). Cultural evolution: Human history as the continuation of evolution by (partially) other means. In D. Dunér & G. Sonesson (Eds.), *Human lifeworlds: The cognitive semiotics of cultural evolution* (pp. 301-336). Frankfurt/M.: Peter Lang.

Sonesson, G. (in preparation). The relation of pictorial to verbal resources in Sahagún's *Codex Florentino*.

Sonesson, G., & Lenninger, S. (2015). The psychological development of semiotic competence: From the window to the movie by way of the mirror. *Cognitive Development, 36*, 191-201.

Sperber, D. (1996). *Explaining culture: A naturalistic approach*. Cambridge: Blackwell.

Sperber, D. (Ed.). (2000). *Metarepresentations: A multidisciplinary perspective*. New York: Oxford University Press.

Steinbock, A. J. (1995). *Home and beyond: Generative phenomenology after Husserl*. Evanston, Ill.: Northwestern University Press.

Suchman, L. A. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge: Cambridge University Press.

Testart, A. (2012). *Avant l'histoire: l'évolution des sociétés, de Lascaux à Carnac*. Paris: Gallimard.

Thompson, E. (2007). *Mind in life*. Cambridge, MA: The Belnap Press.

Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.

Tomasello, M. (2008). *Origins of human communication*. Cambridge, MA: MIT Press.

Tulving, E. (1983). *Elements of episodic memory*. Oxford: Clarendon.

Varela, F. J., Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. Cambridge: MIT Press.

Vygotsky, L. (1962). *Thought and language*. Cambridge, MA: MIT Press.

Welton, D. (2000). *The other Husserl: The horizons of transcendental phenomenology*. Bloomington: Indiana University Press.

Wolf, G., Connors, J., & Waldman, L. A. (Eds.). (2011). *Colors between two worlds: The Florentine codex of Bernardino de Sahagún*. Florence: Kunsthistorisches Institut in Florenz, Max-Planck-Institut.

Zahavi, D. (2003). *Husserl's phenomenology*. Stanford, Calif.: Stanford University Press.

Zahavi, D. (2005). *Subjectivity and selfhood*. Cambridge, MA: The MIT Press.

Zlatev, J. (2002). Mimesis: The 'missing link' between signals and symbols in phylogeny and ontogeny. In A. Pajunen (Ed.), *Mimesis, sign, and the evolution of language* (pp. 93-122). Turku: University of Turku.

Zlatev, J. (2003). Meaning = Life (+ Culture). An outline of a unified biocultural theory of meaning. *Evolution of Communication, 4*(2), 253-296.

Zlatev, J. (2007). Embodiment, language, and mimesis. In T. Ziemke, J. Zlatev, & R. Frank (Eds.), *Body, language, and mind* (pp. 297-338). Berlin & New York: Mouton de Gruyter.

Zlatev, J. (2009). The semiotic hierarchy: Life, consciousness, signs and language. *Cognitive Semiotics, 4*, 169-200

Zlatev, J. (2011). What is cognitive semiotics? *Semiotix: A Global Information Bulletin*, XN-6. Retrieved from http://www.semioticon.com/semiotix/2011/10/what-is-cognitive-semiotics/

Zlatev, J., Madsen, E. A., Lenninger, S., Persson, T., Sayehli, S., Sonesson, G., & Weijer, J.V.D. (2013). Understanding communicative intentions and semiotic vehicles by children and chimpanzees. *Cognitive Development, 28*, 312-329.

About the author

Göran Sonesson (goran.sonesson@semiotik.lu.se) is professor of semiotics and head of *Centre for Cognitive Semiotics* at Lund University, Sweden. He has a doctorate in linguistics from Lund University and another one in semiotics from Ecole des Hautes en Sciences Sociales. After working with gesture studies and Mayan languages, he has mainly been involved with the semiotics of pictures since the publication of his book *Pictorial Concepts* (Lund, LUP 1989), putting particular emphasis on the problem of iconicity and pictorial rhetoric. Consistent with his synthetic approach to pictures, he has in recent years promoted cognitive semiotics, as a way of doing semiotics which relies on experimental studies, and which relates the semiotic function to more elementary cognitive abilities. He is a founding member of the *International Association for Visual Semiotics* (AISV/IAVS), created in 1989, and the *International Association for Cognitive Semiotics* (IACS), initiated in 2013.

Language and Semiotic Studies

Volume 2 Number 4 Winter 2016

Contents

ISSN 2096-031X

9 772096 031169 12>