From Remembering to Memory by Way of Culture.
A Study in Cognitive Semiotics.

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Abstract*:* Cognitive semiotics is a term increasingly being used for a field combining some of the insights, theories, findings and methods of classical semiotics and of cognitive science. The notion of memory plays an important part in at least one of the theories of classical semiotics, that of Lotman, which can be connected both to earlier philosophical (notably phenomenological) reflection and to psychological theories. It can also be related to ideas of distributed and situated cognition in contemporary cognitive science. Memory is also fundamental to at least one of the initiators of cognitive semiotics: Donald's scale of evolution, which identifies phylogeny with a series of stages defined by different kinds of memory, brings cultural evolution directly into the definition of human specificity. In other respects, Donald's work may be mistaken or at least incomplete, and part of this paper will be dedicated to some of the ways in which it might need to be amended to comply with exigencies from semiotics. Finally, we will look at a particular artefact, the photograph, as a memory aid manifesting a threefold indexical relation.

Keywords*:* Memory, phenomenology, intentionality, evolution, photography

The aim of the present paper is to bring together some ideas from semiotics, phenomenology, and cognitive science, in a form that is "essentially armchair speculation, casual observations, and fruits of intuition" (Tulving 1983, 32). A more prestige-laden term for this is "meta-analysis", at least if it is taken in the sense of Bouissac (1999:4), 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" (Cf. Sonesson 2012). In any case, the task is not only to find out whether these different specialities talk about the same thing,

using different names, but more importantly, to investigate whether by bringing them together, we may in fact be able to isolate different phenomena, which are nevertheless intricately connected, as Peirce puts it in his definition of phenomenology (later re-baptized phaneroscopy; CP 1.286).

1. Introduction 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 finding from classical semiotics and cognitive science, including those discipline 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 2012). 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 has recourse to phenomenological analysis, on the one hand, and experimental studies on the other. It starts out from Thomas Daddesio's (1994) observation that semiotic structures cannot be studied without also taking into account semiotic abilities, and adds to this the caveat that a connection needs to be made between mental structures and abilities that are not specifically semiotic.

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.

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 worthwhile submitting

to the artificial variation characteristic of experimental studies, and to make sense of the results of these experiments. 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 makes resistance and which we resist (according to the double characterization of Secondness as described by Peirce), but also of other subjects, who also may resist us as well as assist us, but in more subtle 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 separating 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.[1]

		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

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

In this article, I will work entirely within the phenomenological mode. 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 from seeing the whole sequence of action to be imitated, and the differential understanding of seeing the same thing in perceptual reality, by means of streaming video, by means of pre-recorded video, and using a mirror image (Zlatev et al.

[1] 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

2013; Hribar et al. 2014; Sonesson & Lenninger, in press). None of these studies involved memory, except, of course, as a disturbing factor. All the studies were preceded and prepared by phenomenological reflection. There is therefore every reason to think that some of the phenomenological glosses below will in the future be the subject of experimental semiotics. Phenomenology should be understood here both in the Husserlean and the Peircean sense. As I have shown elsewhere (Sonesson 2009a; 2013), the operations of these two methods are essentially the same, the Peircean restriction to threefold division making it into a special case of Husserlean phenomenology.[2]

Following Daddesio's precept, we will attend to both structures (typically described by semiotics and the human sciences) and abilities (typically accounted for by psychology). Moreover, we will relate semiotic abilities and structures to other kinds of mental abilities and structures. Memory is a structure, which at least in some cases is of a semiotical nature. Remembering is an act, dependent on certain mental abilities, which is mental without being semiotical, though it may apply to semiotic structures. This, at least, is what we are to suppose at the beginning of this journey.

2. The Accumulation and Communication of Meaning

As one of rather few semioticians, Jurij Lotman (1976; 1979) has focused on the notion of memory, describing culture as being an immense memory store, and thus the subject of both accumulation and communication, accumulation having the priority. However, if anthroposemiotics must of necessity be a part of zoosemiotics, and thus of biosemiotics, in spite of not being reducible to it (Cf. Sonesson 2009b), we need to understand what is specific to memory, considered as accumulated meaning. As it has been must clearly delineated by Jordan Zlatev (2009b), life, which already supposes some kind of meaning, encompasses consciousness, which comprises culture, which contains the sign function, which, as one of its possibilities, embraces language.[3] But, if so, there is a difference between accumulation as applied to life, and any of its subcategories, and to non-living things, and if both can be

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

[3] In this article, Zlatev (2009b), does not make any difference between culture and signs, but he has done so more recently in his lectures, following upon our discussions. Cf. Zlatev, forthcoming.

communicated, communication means different things in the two instances. Indeed, as I have argued elsewhere (Cf. Sonesson 1999a), communication in the semiotical sense consists of offering up a task for interpretation to another subject, whether this involves any displacement in time or space, and whether there is any change of coding system or not. In contrast, communication, in other domains, essentialy involves displacement in time and space. This then poses the question how accumulation is different in the two cases.

2.1 Inheritance Systems and Memory

According to Eva Jablonka & Marion Lamb (2005), four kinds of inheritance system play a role in evolution: in addition to genetic inheritance, there is epigenetic inheritance (conveyed, notably, by means of methylation), and there is information transmitted by means of behaviour, as well as by signs. Methylation is chemical process, in biological systems controlled by the catalyzation of enzymes, which results in the addition of a methyl group to a substrate or the substitution of an atom or group by a methyl group. Methylation of DNA is a common epigenetic signalling tool that cells use to lock genes in the "off" position. Like the genetic inheritance system, the epigenetic one is conveyed by biological means, but the epigenetic system, in the view of Jablonka & Lamb (2005), is largely Lamarckian, that is, involves inheritance of acquired characteristics. That cultural evolution is Lamarckian is often taken for granted. Nevertheless, Richerson & Boyd (2005) have shown that Darwinian evolution may be important also in the cultural domain, but, as we have suggested (Dunér & Sonesson, eds., in preparation), rather as a kind of filter applying to other factors. The other factors, mentioned by Richerson & Boyd (2005), are random forces, which may be distinguished into cultural mutation and cultural drift; decision-making forces, resulting from guided variation; and biased transmission, which may apply to content, frequency, or models.

The inheritance systems postulated by Jablonka & Lamb (2005) cannot simply be identified with the four kinds of memory that, according to Merlin Donald (1991, 2001), make up the stages by means of which human beings have become different from other animals (Cf. Fig. 1.) call *Episodic memory*, the memory for single situated happenings, is something which human beings share with many other animals. *Mimetic memory*, or perhaps rather the peculiarly human form of mimetic memory, is restricted to human beings and their predecessors, such as *Homo ergaster* and/or *Homo erectus*. Contemporary primatology suggests, on the other hand, that non-human primates may possess similar capacities (Cf.

Tomasello & Call 1997; de Waal 2006; Persson 2008). Many remarkable things seems to happen within the stage which Donald calls the *mimetic stage*: there is tool use, imitation, gesture, and pantomime, some of which involves sign use and others not (Cf. Sonesson 2007a, b).

Type of memory	Type of accumulation	Type of embodiment
Episodic	Attention span (event in time/space)	—
Mimetic	Action sequence co-owned by *Ego* and *Alter*	Own body
Mythic	Transient artefact co-produced by *Ego* and *Alter*	In the interaction between *Ego* and *Alter*
Theoretic	Enduring artefact co-externalised by *Ego* and *Alter*	External in relation to *Ego* and *Alter*

Figure 2. Donald's evolutionary scale, as interpreted by Sonesson 2007a, b

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 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).[4]

Episodic memory, it would seem, is not an inheritance system at all, since it does not go beyond the individual organism. As for the distinction between inheritance by means of

[4] 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.

behaviour and signs, both mimetic and mythic memory must involve both kinds, while theoretic memory is clearly on the side of signs. More importantly, however, memory is an *intentional* term, in the sense of Franz Brentano 1885 [1924] and Edmund Husserl (1913; 1950), that it, it is something which is *directed* – and this should not only be understood in the sense of there being something which memory is a memory *of* (the "aboutness" of Searle and other recently reformed analytical philosophers), but also that there is somebody whose memory it *is*. In other words, intentionality implies a subject as well as an object. However remotely the latter feature may be realised in exograms, they depend on intentionality both for coming into being, and for being accessed. Genetic and epigenetic inheritance systems alike, on the other hand, are not intentional, and thus not memories.

2.2. Memory as Accumulation

The accumulation of information as well as of merchandise (for which read: material objects), Jurij Lotman (1976) suggests, precede their interchange and is a more elementary and more fundamental characteristic of a culture. According to Lotman, material objects and information are similar to each other, 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; 2010).

Some of the characteristics that Lotman attributes to information are reminiscent of those which are mentioned by Masuda (1980), one of the first propagandists of information society, but in some respects Masuda appears to say something very different: in his view, information is not consumable, no matter how much it is used, and it can be transferred to a new place without disappearing from the point of origin; it is not accumulated if it is not used as is the case of material goods but, on the contrary, by being used increasingly and being integrated with other in- formation. Where Lotman pinpoints parallels between merchandise and information, Masuda insists on their differences, observing that information, contrary to material objects, may be transferred to new places without disappearing from their point of departure, as well as being used without being dissipated and spent; and where Lotman argues

that information stays separate from the organism, Masuda claims it is integrated with other information, which could be taken to refer to a process taking place in brain structures, but also, more reasonably, could be expressed in terms of semantic, or more broadly, semiotic, structures. Again, it is necessary to spell out what is here taken for granted by Masuda: if accumulation means integration into pre-given structures, the accumulation of information is something very different from the accumulation of material objects. Far from being a kind of piling up of items, the accumulation of meaning is an intentional process, in the double sense of being about something and being for somebody.

Against Masuda as much as against Lotman, on the other hand, it is possible to object that even the most elusive kind of information must be incarnated (or "embodied") in some type of material substance, quite apart from the fact that all access to the information in question depends on some material devices called books, canvases, records, computers, hard discs, compact disc players, and so on. None of these devices are purely material, however: they contain *remote intentionality*. I have used this term to describe cases in which a subject must be supposed to be at the origin of the process, even though there does not need to be anybody specifically around at the moment of creation: this is the case, for instance, of the camera placed at the finishing-line of a horse race, which is automatically taking a snap-shot when the horses cross the line, but which must have been set up do to this very job by some subject (Cf. Sonesson 2002).[5] Latter-day propagandists for extended mind often seem confused about this fact. Quoting a Nobel prize winner who objects to his interviewer that what he has written down on paper is not a mere record of his work, but working itself, Clark (2011: xxv) suggests that "the loop through pen and paper /---/ provides a functionality which, were it provided by goings-on in the head alone, we would have no hesitation in designing as part of the cognitive circuitry." But this is so, because the pen and paper, or rather the uses to which they are put, are prepared beforehand to incorporate remote intentionality.

In the cases of mimetic memory, as we have seen, the material devices for accumulating meaning and circulating it are the very bodies of the subjects. Even so, these meanings may be circulated as signs rather than are mere behaviour, when, for instance, they are embodied as gestures or as sand paintings. It is theoretic memory that is necessarily of the order of signs, and has to be circulated and accumulated independently of the body of the subject.

[5] In this particular case, there may be intentionality both in the phenomenological sense, and in the colloquial one, but it is often important to make the distinction, although the phenomenological notion would seem to comprise the colloquial one as one of its subtypes.

Harold Innes (1972 [1950]) differentiates all cultures according as they favour more lasting storage media which are difficult to transport, such as stone tablets, or media which are less enduring, but easier to transport like the papyrus. In other words, it could be said that some media are better for conserving information in time, while other do a better job of sustaining it in space — which could also be expressed in Lotman's terms by pointing out that some media provide mainly for accumulation and others for circulation. Clearly, however, the term ''accumulation,'' used by both Masuda and Lotman, as well as the term ''storage media,'' employed by Innes, suggests that we are somehow concerned here with what can be preserved, not, as material objects, in a storehouse, but in memory. Individual memories, however, may well be accumulated (and integrated), but not transferred. In order to be both accumulated and transferable, it seems, memory must be social: we know it as tradition (in the sense of hermeneutics), as rumour, but also as collective memory. Another name for tradition (and rumour) is history, including prehistory. In this sense, tradition starts with mimesis, comes of its own in mythic memory, and is finally consolidated at the theoretic level.

3. Episodes in the Life of a Tick

As opposed to an objectively described ambient world, the *Umwelt*, as it is conceived by Jakob von Uexküll (1973[1928]), is characterised for a given subject, in terms of the features which it perceives in the world (*Merkwelt*) and the features which it impresses on the world (*Wirkwelt*), which together form a functional circle (*Funktionskreis*). According to a by now classical example, the tick hangs motionless on a bush branch until it perceives the smell of butyric acid emitted by the skin glands of a mammal (*Merkzeichen*), which sends a message to its legs to let go (*Wirkzeichen*), so that it drops onto the mammal's body. This starts a new cycle, because the tactile cue of hitting the mammal's hair incites the tick to move around in order to find the skin of its host. Finally, a third circle is initiated when the heat of the mammal's skin triggers the boring response allowing the tick to drink the blood of its host. Together, these different circles consisting of perceptual and operational cue bearers make up the interdependent wholes of the subject, corresponding to the organism, and the *Umwelt*,

which is the world as it is defined for the subject in question.[6]

3.1. Divergences between Uexküll and Peirce

Scholars involved with biosemiotics tend to take this model, immensely enlightening as it is in itself, and simply project onto it the sign conception suggested by Peirce. Elsewhere, I have suggested that Peirce's notion of sign is too broad to catch the specificity of the sign as ordinarily understood, as Peirce himself recognized in his late writings (Sonesson 2010; 2013) but here I would like to show that it is specific enough to show that there is no sign in the experience of the tick, in spite of the fact that to Uexküll himself the "stimulus" was represented in the nervous system by a "sign".

Very tentatively, let us suppose that, in the biosemiotic conception, the features of the world observed by the animal correspond to the sign-vehicle or expression (Peirce's "representamen"); the object or referent would then be that which causes these features to be present to the animal; and the Peircean interpretant or content would in turn correspond to the pieces of behaviour which tend to make up the reaction of the animal to the features in question. According to the definition of the sign that I have spelled out elsewhere (Sonesson 2010), there must be, apart from the referent, an expression that is given directly but not in focus, and a content that is in focus but indirectly given, and all three instances must be clearly differentiated from each other. In the case of the tick, however, expression and content are not differentiated, already because they do not appear to the same consciousness. The butyric acid is there to the tick; the mammal is present only to us (where us includes at least other mammals). In addition, it does not make sense to say that either the butyric acid or the mammal is in focus or not. Nor is there any sense in determining whether the butyric acid or the mammal is directly given.

Nevertheless, problems starts towering up already when we consider the Peircean notion of sign. As Ziemke & Sharkey (2001:709) point out, it is hard to find the object of the sign, in the ordinary sense of its referent, in the "outside world". Indeed, I think it is impossible. What is for us, as observers, three cues to the presence of a mammal – the smell of butyric acid, the feel of the skin, and the warmth of the blood – do not have to be conceived, in the case of the tick, as one single entity having an existence of its own (a

[6] I will take for granted in the following that Uexküll is right in claiming that these three features is all the tick will ever experience in the world. Even if it turns out that the life of the tick is much more full of adventure than Uexküll thought, this is irrelevant to the following discussion.

"substance", in terms of James Gibson), but may more probably constitute three separate episodes producing each its own sequence of behaviour. What is lacking is real Thirdness: the reaction to the primary reaction, that is, the reaction that does not respond to a simple fact (Firstness), but to something which is already a reaction, and thus a relation (Secondness). Without having to enter into the earlier discussion of differentiation, we see that, even from a strictly Peircean point of view, there is no Thirdness for the tick: it does not respond to any relationship, since it is not aware (even in the most liberal sense of the term) of any second term (the mammal) to which the first term (the butyric acid) stands in a relation.

In fact, things are even more complicated. In a true sign relation, the mammal is not really the object, in the Peircean sense, for which the butyric acid is the representamen. Or, to be more precise, it is not the "dynamical object". At the very most, it is the "immediate object". It will be remembered that, in Peirce's conception, while the "immediate object" is that which directly induces the sign process, the "dynamical object" is something much more comprehensive, which includes all those things which may be known about the same object, although they are not present in the act of inducing. Indeed, the "dynamical object" is that which corresponds to the potentially infinite series of different interpretants resulting from the same original immediate object. It should be clear that, for the tick and similar beings, there could be no distinction between direct and dynamical object, because there is no room for any further development of the chain of interpretants.

We do not have to suppose that objects and interpretants are parts of signs, but we may take them to be any items imbued with meaning, and it will follow that time is needed to go from the immediate object to the dynamical objects, as well as to follow the interpretants on their way to infinity. There is no reason to suppose that the tick is able to do any such temporal explorations. One may wonder, at this point, whether the tick does not even have episodic memory, in the sense of Tulving. The question would be trivial, if Tulving (1983:1) is right to claim that other animals may "benefit from experience, acquire the ability to adjust and adapt, to solve problems and make decisions, but they cannot travel back in their own minds" as human beings can. In the last few years, as we shall see, several researchers have claimed that the ability for time travel is not as uniquely human as Tulving supposed, and as Corballis (2011) has recently reiterated, but they may not want to extend this ability to ticks. On the one hand, I think it can be claimed that the tick has, in Tulving's terms, "behavioural memory": partly because of the way the world is constituted, and partly out a sense of timing, it cannot accomplish its three acts in just any order. On the other hand, it can be argued that

the tick lacks something even more fundamental than episodic memory: the experience of time.

3.2 From the Stream of Consciousness to Time Travel

In an earlier section, I made a lot out of the notion of intentionality, understood, in the sense of Franz Brentano (1885) and Edmund Husserl (1913; 1939; 1950), as directedness (not only *to* an object but also *from* a subject, as explained above), which, for our purposes, is agreement enough (whatever may be the other differences between them; cf. Cavallin 1990). It is interesting to note that a neuroscientist such as Gerald Edelman (1992), whose professional access to the mind is of a different nature, still recognizes intentionality, and, as he puts it, other "Jamesean properties", as being irreducible characteristics of (human) consciousness.

William James (1978[1890]: I, 179-182) is of course particularly famous for having introduced the idea of there being a "stream of consciousness", or, as he also says "of thought" (therefor often being credited with having influenced modernist novel writers using "interior monologue"), in which the "specious present" is surrounded by "fringes" extending both to the past and the future. As Aron Gurwitsch (1957) has shown, James' idea of the stream of consciousness is very much the same as Husserl's (1966[1928]) conception of time consciousness, each of them insisting (here in James's words) that it consists of "time-parts /---/melt/ing/ into each other as dissolving views, and no two of them feel the object just alike, but each feels the total object in a unitary undivided way" (James (1978[1890]: I, 279).

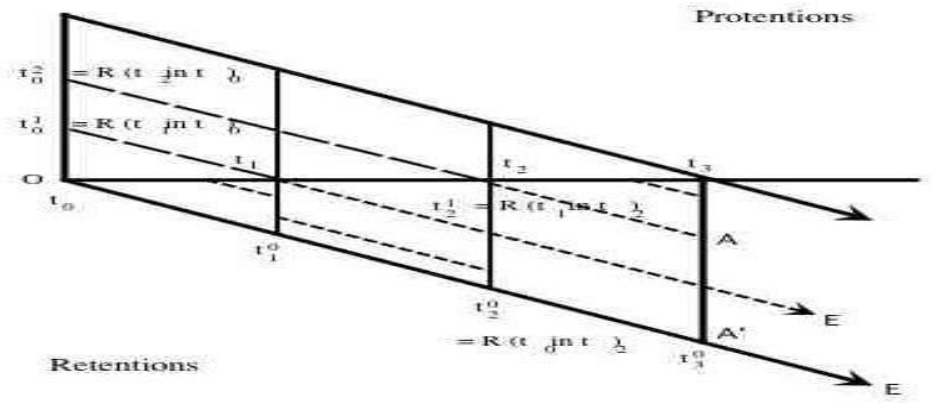

Fig. 2. Time consciousness according to Husserl (1966[1928]), as extended in both temporal direction by Sonesson (1999c)

Husserl, however, would seem to be more precise in his description, because he specifies that each present moment already includes references to the past (retentions), which comprehends references to even earlier moments, and so on (retentions of retentions, etc.), and references to the future (protentions), enclosing references to even later moments, and so on (protentions of protentions, etc. Cf. Fig. 2). This means that each retention flows into another, and so do the protentions, and there will be retentions of protensions and protentions of retention in addition. Retentions and protentions may already give rise to a kind of accumulation of meaning, in Lotman's sense, or more specifically, of sedimentation of meaning, as Husserl (1939) understood the latter term: a the layering of meaning over meaning in time.

Thus, retentions and protentions are clearly distinct from the acts of remembrance and anticipation, which are active events in their own right. As Husserl (1966[1928]) insists, protentions and retentions are parts of acts, and should not be confused with the active acts of remembering and anticipation. It therefore would seem that it is not enough (but certainly necessary) to have a stream of consciousness, to be able to engage in time travelling.

According to Donald (1991: 149), apes live entirely within the bounds of *episodic* memory, which means that "their lives are entirely in the present, as a series of concrete episodes, and the highest element in their system of memory representation seems to be at the level of event representation." To live entirely in the present may seem a simple condition, but if it implies awareness of the insertion of the present within the past and the future, it is already a complex capacity. Indeed, it would require what Husserl calls retentions (of the past) and protentions (of the future). This is very different from living in the present, without opposing it to the past and the future, as we would expect to be the case with Uexküll's tick. Donald is no doubt aware of this, since he attributes his episodic memory specifically to apes and human predecessors. But one would then expect there to be also a pre-episodic stage. I will argue that to live in the present *knowing it to be the present* is to live in the stream of consciousness with its retentions and protentions; but to live in the present without being able to appreciate its difference to the future or the past is an even more simple condition which seems to characterise, among many other animals, also the tick.

Although we can never know what it feels like to be a tick, there does not seem to be

any reason to postulate anything similar to the stream of consciousness in its experience. It was pointed out above, that the three acts of the tick must be accomplished in a certain order. Thus, at some level (not properly described as consciousness), the *Umwelt* of the tick is structured by time. But it is time structured according to McTaggart's B-series, that is, in terms of before and after, not, as in the stream of consciousness, following McTaggart's A-series, or in order words, in terms of past, present and future (Cf. Gell 1992: 149ff). To get from the B-series to the A-series, there must be an insertion of an ego, for which there is a lapse of time before the present as well as after it. Nothing like that would seem to be necessary for the tick to function as such, in spite of the putative subjectivity of the *Umwelt*. The tick does not need to remember that it has let itself drop from the bush when it starts drinking the blood of its victim.

But there are of course many creatures in the world more similar to human beings than to ticks. Indeed, earthworms, as Darwin showed in a little known publication (quoted by Hurford 2007:37), carry different kinds of objects in different ways, which means, at least according to Darwin, that they are aware of many properties of the objects and adapt to them; this theb puts them well beyond the feature detection of the tick. Whether earthworms also have a more advanced relation to time is, as far as I know, unknown. In a famous study, however, Clayton & Dickinson (1998) showed that scrub jays were capable of what Tulving calls "time travel", because they remember where and when they hoarded food, and also the nature of the food in different caches. This seems to suggest that scrub jays do not only possess a stream of consciousness, but they are capable of accomplishing the active acts of remembrance and possibly also anticipation. There seems to be no denying that this is a kind of time travel, although it so far seems to be limited to a domain of particular interest to any animal, food resources. It comes no doubt as less of a surprise that chimpanzees have been shown to be able to amass stones for using next day in order to throw them at the tourists coming to look at them at the zoo, and that both chimpanzees and orang-utans are capable of picking out the right tool beforehand for a task they are to accomplish later (Osvath 2009; Osvath & Osvath 2008; cf. Waal 2013). These are certainly active acts of anticipation, which would seem to involve also some acts of remembrance, and they are not as directly (though in the second case they may be indirectly so) geared to the procurement of food as in the case of the scub jays. Thus time travel, in Tulving's sense, seem to be present and going well beyond the experience of the stream of consciousness.

In a study which is a least as famous a landmark study in recent animal psychology as

the one of scrub jays, Cheney & Seyfarth (1990) showed that vervet monkey used different alarm calls to signal the presence of different predators, which also required a different flight behaviour: bark for leopards, cough for eagles, and chutter for snake. However interesting the question, we are not going to discuss here the well-known issue whether this means that vervet monkeys are capable of using signs. In the present context, we are instead going to attend to Zuberbühler et al. (1999), who, starting out from the observations of Cheney & Seyfarth (1990), studied a similar alarm call system in Diana monkeys, demonstrating that the monkeys were more upset (giving more repeat calls) when, five minutes after hearing an eagle alarm call, they heard the growl of a leopard instead of the shriek of the eagle (Cf. Hurford 2007). This shows that, in some sense, the monkeys retained the memory of the meaning of the alarm call they had heard for at least five minutes. That is, in our terms, they still experience the retentions of numerous anterior rentions of the alarm call. This is no evidence for time travel, however. Rather, it would seem to indicate that Diana monkeys have some kind of stream of consciousness, in which retentions upon retentions go on for at least five minutes. It is quite possible, of course, that another study will present evidence for Diana monkeys being capable of time travel. Nevertheless, it seems clear that we should have to differentiate the kind of memory testified to by the stream of consciousness, and that which allows for time travel. Let's call the first kind *running* memory, and retain the term episodic memory for the kind involving time travel or, in our terms, active acts of remembrance and anticipation.

4. The Evolutionary Emergence of Semiotic Resources

As we have seen, Merlin Donald (1991; 2001) describes human evolution as a series of stages bringing forth different kinds of memory, corresponding each time to a number of well-known semiotic resources, all present in human beings. The only one of these stages that does not have a clearly semiotic character is *episodic memory*, the memory for single situated happenings, which is also shared with many other kinds of animals. I have suggested above, however, that far from being the most elementary condition, episodic memory in this sense already supposes the stream of consciousness. And we have seen that time travel, which is not restricted to human beings, is not the same thing as episodic memory, if this can be identified with the stream of consciousness.

Type of memory	Type of accumulation	Type of embodiment
Episodic	Attention span (event in time/space)	—
Mimetic	Action sequence co-owned by *Ego* and *Alter*	Own body
Mythic	Transient artefact co-produced by *Ego* and *Alter*	In the interaction between *Ego* and *Alter*
Theoretic	Enduring artefact co-externalised by *Ego* and *Alter*	External in relation to *Ego* and *Alter*

Table 3. Four kinds of memory.

4.1. Genetic and Generative Relations

Living in the stream of consciousness, and even being able to accomplish restricted instances of time travel, is also very different from living within a genetic-generative horizon, in which past, present, and future are more consciously construed as part of a tradition or a life-story. The terms genetic and generative as used above derives from Husserl's late, unpublished, work, which is only now being unearth (Cf. Welton 2000; Steinbock 1995). According to this conception, 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 give it is validity, in the way in which geometry, in Husserl's most well-known example, 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 has become known, which may be acts of perception, memory, anticipation, imagination, and so on. The term generativity (which has nothing to do with Chomskyan generative grammar) is meant to evoke the ideas of generations following each other, as well as the trajectory accomplished by each individual from being born to dying.

Endel Tulving, who coined the term "episodic memory", as Donald (1991: 150) also notes, seems to be thinking about something more along these lines, since he claims that it requires language, and that it is exclusive to human beings. Whatever the time

travel capacities of scrub jays and other animals, it does not seem to follow that they must be capable of what Tulving calls ”autonoetic consciousness” which is supposed to accompany the act of remembering, thus enabling the individual to be aware of his/her self in subjective time. Here we seem to be well beyond the stream of consciousness, episodes, and even time travel.

Tradition, in this sense, is roughly mirrored in the notion of scheme introduced by the cognitive psychologist Fredrick Bartlett (1932: 32, 44) to account for our ‘‘effort after meaning.’’ Bartlett used the notion of scheme in his studies of memory, in order to explain the successive modifications that a story stemming from an alien culture was subjected to, as the experimental subjects were asked to recount it from increasing temporal distances (cf. Bartlett 1923); but also in order to explain how one and the same drawing was transformed in later reproductions from memory, in different ways according as it had been labelled the first time as a pair of glasses or as a dumbbell. The scheme is to Bartlett ‘‘the setting which makes perceiving possible,’’ and, more precisely, it is ‘‘an active organization of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organism’s response,’’ with the result that responses do not occur in isolation, but ‘‘as a unitary mass’’ (1932: 201). The last definition (in spite of introducing a socio-historical dimension) is reminiscent of Uexküll’s notion of Umwelt. On the other hand, it also introduced something similar to Husserl’s notion of sedimentation – and thus of genetic and generative phenomenology.

4.2. There is Something About Mimesis

Considered as a kind of memory, mimesis is stored in the body itself. It is thus a particular aspect of the *embodied mind*, more precisely, embodied memory (Cf. Varela, Thompson & Rosch 1991) According to Donald, as we saw, mimetic memory is restricted to human beings and their predecessors, such as *Homo ergaster* and/or *Homo erectus*. Many remarkable things seems to happen within the stage which Donald calls the *mimetic stage*. From our point of view, it seems important to tell these apart, whether or not some of them “come for free”, once the others are present, as Donald maintains (in conversation).

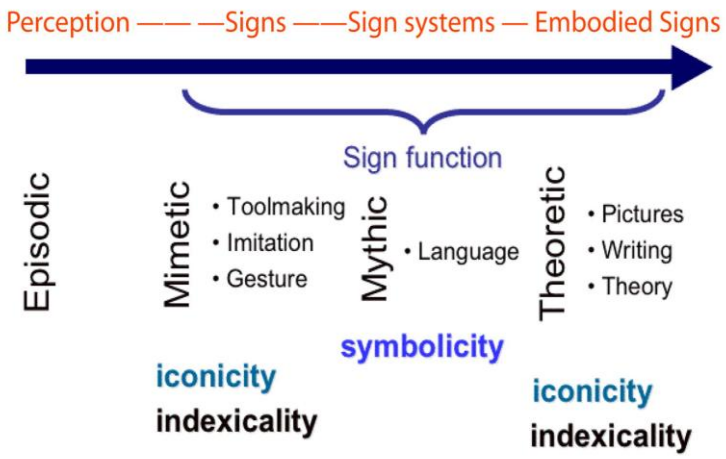

Figure 4

First there is the use of tools in a systematic way, which certainly requires some kind of mimetic memory (which may be thought of as embodied in the limbs). If tool use is going to gain currency in a community, imitation must take place, and imitation would seem to require the capacity to pick up the type given a number of tokens – or, in other words, extracting it from a sequence of episodes. Thus, when seeing somebody use a hammer, which is a token of the hammering act, one must be able to abstract from this individual act and the particular physical and motivational context in which it takes place, which gives rise to a token, thus transposing hammer usage to oneself and to other contexts, giving rise to a second token (Cf. Fig. 1). For such an extraction of types from tokens to take place, pedagogy may be necessary, as suggested by Csibra & Gergely, (2009) and Sterelny (2012). We now know that non-human primates are much better at using tools than was recently thought, but they appear to be notoriously bad at imitation – in the sense of learning new behaviour, not, of course, of repeating species-specific acts.

But, according to this scenario, something even more radical should happen in the mimetic stage: the emergence of the sign function. This would mean that imitation is not used only to perpetuate a type first introduced by a particular token, but to represent a particular token, for instance, the fact of the first human being using a stone for hammering. This is not to say that signs are only used to refer to episodes. On the contrary, most signs would seem to refer to types – and, only by means of types, to episodes. If we start from the first act

observed, nevertheless, it is easier to see that imitative learning and sign use refer to this act in very different ways. Adapting the bodily movement used by some other individual to hammer a nail because you yourself wants to fix a nail to an object is semiotically quite different from imitating even the very act of hammering, because you want to illustrate how this is done, to suggest to somebody how this is to be done, or to convey the idea of a person occupied by the act of hammering. In the first case, your object is to get the nail incorporated into the object. In the second case, you want the act of hammering itself to be observed.

Donald, to be sure, does not attend to any of these differences. He thinks that once human beings have access to mimetic memory of their own bodily actions, the rest "comes for free". Without prejudging on this issue, however, it is useful to separate the different levels corresponding to the mimetic memory of a single individual, the shared mimetic memory resulting from imitation, and the use of mimesis for constructing signs. Donald's next stage, *mythic memory*, corresponds to language, and would thus already require the ability to use signs. In terms of other thinkers, mythic memory must be a case of *distributed cognition*, and more specifically, memory, since it has to be realised together with other speakers (Cf. Hutchins 1995); it could also be considered a kind *situated cognition*, and more specifically, memory, to the extent that it makes use of the environment to convey its ideas (Cf. Clark & Chalmers 1998); but, at least the latter must already- have been true of mimesis. 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. In this scenario, language would seem to be a limiting case: the language faculty might well have an evolutionary origin, but the development of particular languages is part of history. It could be surmised that the very variety of human languages (which goes well beyond the "dialects" found, notably, in the signals systems of non-human primates and birds), which permit them to function as identity markers, is already part of human specificity, even though we now know that the "dialects" found, notably, in the signals systems of non-human primates and birds may also be different as a function of the learning environment.

Another question, which has not received a satisfactory answer, is whether narration must be verbally expressed. It is difficult to deny that films and comic strips convey narrativity, but one could even argue that single pictures and gesture have the

capacity to tell stories, at least in a very general sense. But at least gesture (and also the picture, from one point of view, as we will see) is part and parcel of the mimetic stage, which, in Donald's view, does not involve any narrative capacity. Donald would claim that narrativity only emerges with the *mythic* stage, but that it may then be shared with semiotic resources that have originated at earlier stages. There is no obvious way of showing which answer is the right one, since we have no direct access to evolution. If it could be shown that apes can tell stories by means of gesture and/or pictures, in particular if they can do so without being language-trained, or if small children who have not developed language are able to do so, a parallel in evolution could be suggested. The first alternative a priori does not seem very plausible, and it is not even clear how we could test any of them. But there is a further possibility: that, in human beings, as part of the specific human use of mimesis, narrativity can be embodied in pictures and/or gesture without having passed by language.

4.3. The Advent of Theory

It is in the fourth stage, however, which Donald calls the *theoretic stage*, that history comes of its own. Pictures, writing, and theories are the three examples given by Donald. It would seem, however, that non-human primates and even dogs may be taught to interpret pictures, and some of them have certainly learnt to use some very special kinds of writing (plastic figures, computer keyboards, etc.).[7] But none of them have on their own created any pictures or any pieces of writing, let alone developed theories. It might be objected that there may be human groups that have not developed the use of pictures, and there are certainly those that have not made use of writing. Still, such creation is within the developmental potential of all human beings, and they certainly seem to form part of what being human means today.

It is at least somewhat curious that Donald locates the picture at the *theoretic* stage. This is no doubt because pictures, as we know them today, are always organism-independent artefacts or, in Donald's terms, "exograms". But it is not impossible for pictures to have been at the beginning at least somewhat less independent of the human body, as is the case with tattoos, and/or made in less durable material, such as skin and sand. The latter is well known in the form of sand painting in some traditional cultures, in which they are part and parcel of performances. Indeed, both kinds of picture are still

[7] Or sign language – but if this is problem, it is a problem for the third stage.

marginally present even today, tattoos even becoming increasingly so in recent times. Sand paintings are short-lived acts in time and space, but they still persist as pattern ready to be applied in-between each of their instantiations. Tattoos may have had a similar origin, though nowadays they are more clearly available as types on a pattern sheet.

This could be taken to indicate that pictures are primarily a result of mimesis, but it is not clear that they would therefore be reducible to bodily mimesis. Interestingly, Davidson & Noble (1989) have suggested that depiction is a necessary stage on the way to language, because by means of freezing the percept, it introduces a kind of communication independent of the immediate context and so capable of being the subject of reflection and narrative. In this sense, the picture could be seen as more of a precursor to language than gesture or other kind of mimesis. It could be objected that some kinds of gesture already inaugurates communication independent of the immediate context. However, a case could be made for gesture being itself movement, and thus incapable of freezing the percept. Thus, the picture sign could be an important link between mimesis and language. Still, it is not clear that pictures and gesture are really so different here: besides kinetographic gestures (using Efron's terminology; cf. Kendon 2004:92ff), in which both expression and content are movements, there are iconographic gestures, in which case the movement of the hands serves to trace the borders of the object. The evolutionary relationship of language, gesture and pictures still seems to be rather difficult to extricate.

5. The Photograph as an Artefact of Memory

The picture, as we have seen, is fundamentally an exogram, or, in my terms, an organism-independent artefact, making allowing for phenomena such as sand paintings, which may be on the border between gesture and pictures. Ever since its invention, the photograph has presented itself as a typical exogram in this respect. There are several ways in which the photograph may be said to be a memory artefact. As Peirce pointed out, photographs are both indexical and iconical signs. The indexical aspect of photographs has been very much at the centre of recent semiotics of photography, as epitomized the work of Henri Vanlier, Philippe Dubois and Jean-Marie Schaeffer. As most clearly expressed by Vanlier, the photograph is a

trace of the photons travelling through the air from the object photographed to the light-sensitive emulsion inside the camera. A photograph and a photogram are similar in that way, as I have pointed out elsewhere (Cf. Sonesson 1999b): but the photograph differ from the photogram because of the requirement for recognition, and thus, for iconicity, being dominant. Indexicality only gets the upper hand in a spy photograph, where the task is really to discover what is there on the ground. The indexicality of the photograph is of a particular kind: unlike such classical indices as the personal pronouns, Peirce's weather-cock, the mirror image, and the thermometer Reaumur sent around the world, the trace made on the photographic plate does not immediately go away (Cf. Sonesson 2003). It has the solidity of a real artefact.

There are, however, two further ways in which the photograph may be said to accomplish indexical functions. First, it turns the attention to some place or event in the past. In other words, it is a potent memory aid for time travel. That is, when a person looks at the photograph, this may set him or her thinking about the time and place of its creation, as well as of the circumstances around it. This is, I believe, not simply another side of the same indexicality noted above. Not all indices have the effect of conjuring up images from the past. Indeed, this seems to have been the principal function of signs, or marks, as understood by Hobbes and Leibniz (cf. Dascal 1978). Like the proverbial knot of the handkerchief, such marks serve simply to enhance perceptual experience, or to link it to a past experience (Cf. Sonesson 2009b). As such, they have no content of their own. The photograph is different in this respect, because it both shows a fragment of the past in a pictorial mode, and contains incitement to the mind for extending this experience further into space and time. There have been complaints recently in the popular press of photography losing nowadays this memorial function. Photographs are now rarely printed out and put into albums, but stored on hard discs which may suddenly stop working, and, in any case, thanks to the camera in the cellular phone, they are now so numerous that it is impossible to find the time to peruse them. If so, we should not forget that this is a function the picture acquired with the advent of photography. There can be no doubt, in any case, that hand-made pictures only fulfilled this function rarely and incompletely.

There is a third way in which the photograph as memory is involved with indexicality: the classical tourist photograph shows the voyager in contiguity with a landmark, which could be a prototypical landmark such as Big Ben or the Eiffel Tower, or some less well-known object which only makes sense to the voyager himself precisely because he/she (and his/her

camera) has been there. Instead of abandoning this indexical memory function, digital photography seems to bring it to its fulfilment, though landmarks are now more rarely places and buildings, but rather persons, as seen in the now endemic "selfie", which may show the photographer himself together with the US president and some other world-famous person, or perhaps only with those he/she him/herself know to be his/her closest friends. Whatever the future of the photograph as a memory device, the story does not seem to be over yet.

6. Conclusions

There are many kinds of memory, and memory means many things. To start with, we can distinguish the active act of remembering from memory as a structure. Memory also changes with the kind of semiotic resources in which it is embodied. Some kinds of memory are implicit in the very body of human beings and other animals; other are clearly distinguished artefacts, such as knots on handkerchiefs and photographs; other, finally, are intersubjectivity accessible storehouses of the knowledge of generations and ever further generations of human beings. The interactions of semiosis and memory are complex, and we are still far from understanding all complexities of their interrelation.

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