EXPERIENCE, REASON AND THE MATRIX MACHINE. A GENETIC VIEW ON KNOWLEDGE AND MEANING PRODUCTION [1]

ALBERTO ROSA
Universidad Autónoma de Madrid

Are we connected to The Matrix machine?

The Matrix film trilogy is an artistic reflection on the fuzzy limits between 'real' and 'virtual' realities, the nature of human feelings and our struggle for freedom. It offers a powerful metaphor that provides plenty of food for theoretical thought. In particular, I think it offers a good of entry into questions about reason, cognition and experience. In this paper I will argue that semiotics (of a Peircean kind) may offer an explanation of the development of different varieties of experience from which subjectivity and rational knowledge can emerge.

Rationality, Experience and Knowledge

The Matrix metaphor, as I see it, builds on the notion of *psychophysical parallelism*, whose main representative was Leibniz. Pictured in a rather crude way, this view posits that changes in the world produce changes in the mind, which represent what is going on «out there». Perceptions and sensations, together with the work of reason, provide the basis upon which we experience, understand and act. If there were a way of faking the input (as the Matrix machine does), subjects could be made to experience a virtual world as real.

This outcome is consistent with Descartes' thought experiment of the evil demon. But it does not make any difference whether there is an evil agent (either Matrix or the demon) providing faked information, or a benevolent god guaranteeing that the flow of information goes unhampered. In both cases minds are reduced to peripheral devices connected to the great machine of the world.

Epistemologically, this framework entails that knowledge construction is the result of a rational organisation of the information we receive. Eventually, by accumulating and processing information, we will reach a representation of

---

the real world, and the principles upon which it works. This in turn will allow for greater degrees of control of our future. As Descartes said, the issue is how to devise the right method.

Since knowledge is acquired through experience, experience becomes the key issue to be examined. Is it just information? Does it transparently present reality? Psychophysics and Psychology came into existence precisely to solve these questions. The issue was to contrast one's conscious experiences with the working of reality. And going one step further, to investigate how more complex forms of consciousness appear. As Wundt (1897) pointed out, the subject-matter of Psychology was *immediate* experience (experience as object of inquiry), rather than the experiences *mediated* by a particular object (as is the case of the sciences addressing particular kinds of natural objects).

Phenomenology shared this interest in experience, but with a twist: Rather than taking reality for granted, it focused on experience itself, as the phenomena (of consciousness) which provided the foundation for any kind of knowledge. This twist made the issue appear the other way around: Instead of asking «how do we (as natural objects) come to know the world?» the question became, «how does the world (and self) *appear* to us through experience?». So viewed, *experience* is not just a kind of representation of the real coded in some format, but a family of changing phenomena which allow for an increasing awareness of what is going on. Thus, experience is something that develops. *Varieties of experience* (i.e. the development of different kinds of experiences) are what make the world appear as a reality capable of being rationally known. The following pages will be devoted to sketching a view of how the *varieties of experience* develop as a result of how agents relate with their surroundings and increase their capability of dealing with change.

This has several consequences:

1) Reality (and the objects of the world) are not given, but result from processes in which new varieties of experience appear.
2) The objects and the world cannot be conceived without some kind of experience supporting them.
3) Any possible way of conceiving what experience is needs to develop explanations of how natural entities (agents) can feel experiences.
4) It is not enough to be exposed to the same stimuli for sharing the same experiences. Experiences do not only depend on what sensorial interfaces the agent has for relating with its environment; they also result from developmental processes.
5) For a shared knowledge of a reality to exist, a way of communicating subjective experience about the world and its objects has to be developed.
6) This requires some external coding system for the communication of experiences.
7) Communication itself produces new kinds of experiences.

8) Knowledge and rationality (either individual or collective), and the known objects, change throughout time; they are historical products.

Returning to the disquieting metaphor of *The Matrix*, the issue becomes not whether we can be deceived by an evil demon which fakes information, but the even more troubling suspicion that any possible representation we may have of the world is a sort of fabrication, that it is necessarily virtual. The question from a phenomenological approach is, «who then fabricates this virtual reality we live in?».

THE LIVING BODY, CONTEXT AND ACTION: A TRIADIC AND DIACHRONIC APPROACH

To answer this last question we need to leave behind psychophysical parallelism and replace it with an outlook that can explain the varieties of experience. Semiotics is one promising alternative.

Peirce semiotics was included within his Pragmaticism, a way of developing a logic which aimed to provide an explanation not only for biological evolution and human understanding, but also a whole evolutionary cosmology (Peirce, 2007; Sheriff, 1994). Semiosis [2], as action producing sense and meaning in context, was a key concept within his system. It is close to the current ideas about embodied and situated cognition, but goes well beyond that. The agent is alive and acting in a context, and so cannot be understood only as a brain or an information processing device. Even more, what this agent does in its context must have a value of life: the agent needs to have a way of taking notice of changes in the context which have *relevance* for its wellbeing in order to properly react to it. Without this feature, it would be a passive entity, not an agent. In other words, acts are functional, and some kind of monitoring system for the consequences of actions has to be in operation within the agent.

In order to embody and situate agents we need to conceptualize three elements and their interrelation:

1) Agents: entities separated from their surroundings, which are capable of changing their internal states, as well as the state of their surroundings, by means of the movements they perform.

---

[2] Peirce's semiotic logic takes meaning to be a triadic process in contrast to Saussure's view of the result dyadic link between the sign and its referent (the object). A semiosis involves three components (the object, the representamen and the interpretant. An *interpretant* is a sign in the mind resulting from the relationship between the *representamen* (a previous sign) and the *object* it signifies. The *interpretant* also has the capability of becoming a *representamen* in a new semiosis that may follow. Semiosis then can follow one another in a recursive manner. So viewed, an *interpretant* can be a scheme for action, a rule, an inference, an utterance, or a discourse, so that it allows the relationship between the *representamen* and something else to make sense (Peirce, CP 8.343). This is the reason why signs are able to create symbolic objects which get more and more complex as the semiotic process goes ahead.

2) Otherness: whatever the agent relates to, including objects and other agents.
3) Actions: the way agents and otherness relates to each other.

The agent when encountering otherness has to be able to take notice of the encounter. It is by transforming the shape of the encounters between the agent and the othernesses that experience changes. Namely, something must happen in the agent that makes it get some notice of the results of that encounter: this is precisely what experience is. Without this no form of life (natural or artificial) could exist: there would not be any way of distinguishing the harmful and the favourable.

So, *irritability* and *orientation* are the earliest ways in which intentionality show, and could be taken as the first forms of the transformation of experience, showing in the form of movement. This does not require any form of representation. Some quality of otherness produces a movement within the structure of the agent —a complex process happening within the inside milieu of the agent which processes the changes of the outside environment which are *relevant*, have a *value of life*, for the agent, and so ends up producing some re-action, some movement upon the environment.

The issue then becomes how such a simple triadic structure can end up producing the real world and the wonders of Science, Technology and the Humanities. For this to be possible something else is needed, time. Evolution, history, individual ontogenesis and microgenesis, are four different time-scales in which these three elements of the triad interact with each other and in so doing transform themselves —the agent, the otherness and the way of relating them.

If objects are not givens, then they have to be conceived as a consequence of actions (and the transformation of experience and intentionality). By this I do not mean that objects do not exist before that. What I mean is that in principle there is no way of getting acquainted with anything before encountering it in one way or another. Objects, as phenomena of consciousness, are constructed by experience. The issue then is how this can happen.

One can, of course, start by asking how something (an object taken as a sign) can signify something else (the referent object). But, by asking the question in such a manner one is bound to take for granted that experienced objects are real, and we go back to being connected to the (even if benevolent) Matrix machine. And this is what I want to avoid in my argument.

The only way out would be to get into a lengthy explanation of how the simplest possible experience can produce a kind of object that then serves as a sign to create some kind of object, which in turn could act as a sign, and so on and on. This is something I did elsewhere (Rosa 2007a, 2007b; Rosa & Valsiner, 2007) in an attempt to merge together a theory of action with Peircean semiotics. Here I will move on to sketch what I take to be the key steps in the development of the varieties of experience.

SEMIOTICS AND A GENETIC VIEW OF REASON

Valsiner (2002) says that signs have an ontological power; they are capable of making us feel something beyond the sign itself. Semiosis has the power of presenting things immediately, i.e. the sign *appears as* otherness, rather than as *standing for* an otherness. Salvatore & Venuleo (2010), referring to affective semiosis, they say, «[it] reifies: it makes significant and reference the same thing» (p.65). Affective semiosis is symmetrical, is not able to differentiate what is felt from what may have produced what is felt. If we were to follow William James' theory of emotions, this characterisation of affective semiosis could very well fit the description of pure affection-reaction, in which affects are reactions, but also could be taken as signals for what to do when some change affects us. So viewed, affects and emotions are not only a way of monitoring changes in the environment and appraising the results of actions but also a form of signifying —feelings can also be signs (vid. Bartlett, 1925).

Perception is separated from feeling when the *symmetry* (Salvatore & Venuleo, 2008) between experience and otherness to which it refers is broken, so that an early form of differentiation between the agent and its environment appears. For this to happen, affect and perception have to become two separate functions. They start to separate when the agent is capable of positioning vis-à-vis its experience. Now two kinds of experiences get differentiated: one whose content is the effect suffered by the agent, and the other points towards the thing that produced this effect. When this happens, intentionality is well beyond irritability; actions could be oriented either to an otherness, or to the affect felt by the agent, so that the latter could act as a sign of the agency of the agent (González, 1997).

This, I believe, is the most primitive way in which the positioning of the agent appears as relevant for the development of meaning. The actions of the agent could be taken to be addressed either to preserving some state of the agent, or to focus on the otherness with which the agent relates. This positioning can be depicted in the language of semiotics as a differentiation of what could act as a *ground* [3] when performing a semiosis. So viewed, the *ground* is not only some kind of abstraction of similarities between what could act as a sign and what the sign may refer to, but is also a result of being able to differentiate different kinds of relevance —something not foreign to intentionality. Now new varieties of experience appear, but still perception and affects can only be iconic and indexical; they allow categorisation (Sonesson, 2010) of experiences and so can act as signals for the orientation of action.

---

[3]   In Peirce's semiotics the *ground* is what makes the sign capable of signifying an object, it is something they have in common; it is an abstract category that can only come from earlier experience (his better known example is that of black acting as sign of a stove, because both share *blackness* -the ground; Peirce, 1931-58, I.495).

Action is what the agent does for something. The agent moves around in an environment, but not randomly, the outcomes of its actions have a *value-of-life*. Feeling and perceiving result from action, but action itself could become a sign of something else. It is through action, transforming itself in circular reactions, that qualities and presences (icon and index) could come to signal either an otherness or a present state of the agent. Without this there could not be any possible way in which orientation could turn into new forms of intentionality to address things in the environment. When this comes to happen, then actions could become operations, a means of reaching a goal, and so able to act as signals of something else still removed from reach. I believe there is no exaggeration in calling this a conventionalisation of movements (conventional only for the agent itself), a habit, a rule, a *thirdness*[4] connecting qualities and presences, icons and indexes.

Once actions can signal an otherness, the path for the experience of an object opens up. Piaget (1936) takes the notion of object to be a schema binding motor operations together. His criterion for the complete development of the notion of the object, however, requires the agent to look for something even if it has been removed, so that there is no apparent signal presenting it. If there is nothing in the environment signalling the presence of a hidden object and the agent keeps searching for it, there must be a way in which the agent is capable of using something as a way of keeping its presence even if absent to the senses —a re-presentation must exist. Actions then, become capable of signalling for a schema of what one does with the object. From a semiotic approach the object itself results from an argument[5] made up of enactive *dicent signs*, actions turned into operations. When this happens actions become capable of acting as signs of the schema of the object (itself an *argument* made out of *dicent acts*).

Piaget's careful observations about this process brought him and Bärbel Inhelder (Piaget & Inhelder, 1966) to believe that out of action something new

---

[4]   «My view is that there are three modes of being. I hold that we can directly observe them in whatever is at any time before the mind in any way. They are the being of positive qualitative possibility [Firstness], the being of actual fact [Secondness], and the being of law that will govern facts in the future [Thirdness]» (Piece, 1931-58, CP, I.23).

«It seems, then, that the true categories of consciousness are: first, feeling, the consciousness which can be included with an instant of time, passive consciousness of quality, without recognition or analysis; second, consciousness of an interruption into the field of consciousness, sense of resistance, of an external fact, or another something; third, synthetic consciousness, binding time together, sense of learning, thought» (Piece, 1931-58, CP, I.377).

[5]   An argument in Peirce's semiotics is a type of sign gathering together several previous semiosis involving symbols (*dicent-signs*). A dicent-sign, in turn, is an interpretant coming from a semiosis in which the symbol is a conventional sign pointing to a regularity (a legisign). For example, the concept of a ball would be an argument gathering together dicent-signs stating that it is spherical, it bounces, etc.; i.e., that it gathers a set of properties which together make it such an object. This way of conceiving an argument makes it very close to the concept of schema, even if these symbols are not words, but instead, images, gestures or ritualized movements (Rosa, 2007).

appears —mental images, which result from *the internal imitation of accommodative actions*. A new capability then arises: to differentiate an object from the background of other kinds of experiences. This also includes the capability of taking a quality and/or a set of feelings as a sign of the existence of an object. When this happens, the path is open for the differentiation of individual objects from others belonging to the same class. Imitation is a prerequisite for proper semiosis, for the elaboration of socially conventionalised signs.

REPRESENTATION, COGNITION AND COMMUNICATION

Once objects come into existence in experience, the world can start to appear with some kind of stability. The agent is not just reduced to re-acting before signals. These start to come organised in bundles (objects) and by acting upon them, and feeling the results, new ways of acting are learned. As time goes by a world of objects starts to appear. Some are to be acted upon, some are to be avoided, and still others are capable of acting as we are, and as such react to the actions we make in relation to them. The latter are objects which also are agents. A way of noticing the regularities in these ways of acting is also needed. Some actions have to be identified, differentiated as a kind of object, so as to be ready to counter-act to avoid harm.

The story so far told looks like a semiotic re-description of cognition. One may very well say that one could dispense with experience, agency and semiotics altogether. Some kind of statistical device, capable of extracting the regularities filtered by the interfaces relating the agent and its environment, would be enough to explain what is going on when the morphological structures of the agent and the environment couple and produce information, as well as to how this information is processed according to the rules implemented in the structure of the machine, or resulting from previous processing. This is the kind of cognition studied by Cognitive Science, which ends up producing a view of the agent capable of getting a representation of the world through the information fed, as pictured by *The Matrix* metaphor. Such a view takes the world to be a closed system working in reversible time.

As I said before, I am not satisfied with The Matrix metaphor. I believe it leaves aside many important phenomena of life, particularly communication and the elaboration of new objects for the creation of new meaning. That is why I think it is worth going along with my semiotic re-description of cognition. I hope that by using this strategy I will be able to make my point clear: It is by facing the contingencies of inter-action, by figuring out how counter-acting the actions of other agents, or by cooperating in social life, that new goals for action, new individual senses and shared new meanings can develop. Communication is the cradle where proper semiosis develops.

Communication does not start with *expression*, but with *impression* (Gillespie, 2010). As Darwin said, bodily emotions may have a communicative

effect, but this does not necessarily mean that there is an intention of communicating nothing. They simply cause an impression on others. But these impressions are very important, since they may signal to one what to do upon encountering another agent (a hungry predator, an unaware victim, a receptive mate, etc.). By acting and feeling one creates "excess" or "surplus" meaning for somebody else: «these surplus meanings exist for the audience before existing for the actor, and communication is the process of coming to master the effect of these initially naïve expressions are having on the audience» (Gillespie, 2010, p. 27).

Anger, fear, withdrawal movements are among the contents of body actions capable of acting as signals. Emotional movements take a communicative function and become a way of signalling others one's disposition to act (threats, showing submissiveness, recognitions of defeat, etc.), what is an effective way of avoiding harm in social life. When threats and withdrawals appear together in animal interaction in disputing a pray, there is already some kind of join attention upon the same object, as well as a rudimentary reciprocity of perspectives.

TACTIC PRETENCE AND DECEIVING

This leads us to the phenomenon of tactic pretence and deceiving. Some apes are capable of communicating a faked disposition to act, so that other members of the pack are driven to act in a way that is favourable to the intentions of the deceiver (e.g., vid. Byrne & Withen, 1988). This has been taken as evidence of the existence of a «theory of mind» (Premack & Woodruff, 1978), a capability to represent mental states that is also a *meta-representation*, i.e. to represent a representation. Rudiments of this can be observed in some apes, but it only fully develops in children (vid. Carruthers & Smith, 1996).

This functional capability of deceiving demonstrates that the motor movements of an action can change their functionality, their goal (Rivière & Sotillo, 1999), their content. Now, rather that offering an impression of what one feels, one is expressing something to somebody else, as if one were feeling something one is not really feeling, so one may induce the other to act in such a way as to leave room for doing what one really wants to do. This shows that there is already a differentiation between means and ends, a combination of perspectives, and more importantly, between content and reference (Sonesson, this volume). It is precisely by playing with the confusion between content and reference that tactic pretence and deceiving are possible. In addition, a new form of intentionality starts to show —intentions turn into desires focused upon an object (González, 1997).

Tactic pretence shows a rather sophisticated articulation of a world of objects. There is not only a separation of operational movements and goals, of means and ends, expression and content, content and reference, but also of one and the other as agents. In addition, some kind of primitive

intersubjectivity must also be in operation, as well as an early form of individual identity.

OBJECTS, SYMBOLS, AND (VIRTUAL) REALITIES

One may say that the cognitive and semiotic approaches have similar capabilities for explaining how experience ends up producing a world of objects. Cognition can present material objects, but one may say that it tends to offer a world devoid of sense and meaning, in which the closest one could get to a representation beyond that given by the senses is the expected result of some computation (i.e. the operation of the received rules for the functioning of the closed system).

But how can we explain the emergence of new meanings? The current *Zeitgeist* seems to command, that we search for meaning in the shape of neural structures capable of producing an ever increasing number of pre-programmed representational outcomes (including narratives, spirituality and God, e.g., Newberg, D'Aquili & Rause, 2001). If one decided, instead, to answer this question using semiotics, I believe we may dispose of at least a part of *The Matrix* metaphor.

Cognition presents the materiality of objects, and semiotics permits the creation of many other kinds of objects of a symbolic nature. But the limit between what is material, what is real, and what is fictional, is rather fuzzy and prone to produce many errors. However, this is precisely what offers the capability of creating new forms of experience and knowledge! And also new forms of rationality.

Deceiving is a hard bone to chew for cognition, unless modules are left to proliferate. In contrast, a semiotic approach combined with an ecological psychology of action can deal with it without resorting to any kind of *deus ex machina*. What is more, the formalisms of Semiotics can explain how new entities, playing an important role for the direction of action, come to existence.

Events are one kind of such entities: They have no materiality; they do not exist in the world; they have to be constituted. They can only appear as a derivative of change in material states pointing towards an end, something not foreign to the intentional structure of action, evolving from schemas and scripts. Events, as virtual objects resulting from a representation, can only be a product of intentional communication mediated by symbols. It is within scripts, and later on in the communication and representation of events, that objects could be made to stand for other objects, to become a sign for something else that will follow. Symbols can even take the function of creating new kinds of entities. Indexical symbols, such as *I* and *you*, *here* and *there*, put order in the space of the world and separate entities by using objects (sounds) to refer to first person ordered experiences. Iconic representations of animals (eagles, lions, unicorns), coloured lines on a surface, or displays of human

figures, could come to stand for a god, a saint, a leader, an institution or a group. They can even act as a representation for a goal to be attained, a territory to protect, or values to pursue, defend or impose upon others for some imagined good. In representing them they are created as entities.

Ends, goals, ideals, even my self, are not material realities, but virtual entities signified by symbols —material entities fabricated for the creation of virtual realities. But the power of the symbolic function goes beyond the creation of these virtual realities, through it irreversible time also appears. Future and past can then be differentiated from the present; with this comes history, will, and moral accountability.

The ontopotentiality of symbols goes well beyond the realm of material reality. Symbols are indispensable for the creation of social identities from feelings of belonging, constituting desires out of arousals, and constructing duties out of imagined goals; but they also make possible the appearance of new psychological functions, such as imagination and memory. In sum, individual senses, the institution of social meanings, and the creation of new meanings (and symbols) is a result of the development of the symbolic function.

So viewed, the symbolic function does not only create new objects, but also new meanings out of these new symbolic objects. And, beyond that, it transforms the world one experiences. The world is not anymore just a set objects ordered in a space. It is also the place where I (as an object among others) live, where objects have a value for some end, and everybody acts with some purpose. This has very clear consequences: I better govern what I (myself) do, since I am going to be made accountable for the results of my actions.

When this happens, something rather drastic appears. Human agents can go beyond reacting to the contingencies of their lives; they can create new contingencies for the direction of their actions, and leave them behind for the generations to come. They can imagine new sceneries, and devise ways for turning them into material realities —for good and for bad; we should take good care in remembering that the symbolic function began its development as a capacity for deceiving!

Conclusions: Can we dispose of The Matrix machine?

Experience, cognition and reality are the three main issues touched upon in this paper. As the argument went, it seems that *cognition* is better suited to what usually is called the material realm, while *experience* fits better for the explanation of proper meaning. This can hardly be any news. The old separation between the Sciences of Nature (*Naturwissenschaften*) and the Sciences of the Spirit (*Geisteswissenschaften*) seems still to be in operation. Perhaps the old dream of reuniting the sciences devoted to the study of the realms of nature and the spirit might be reached. Karl Otto Apel (1975) has

suggested that semiotics (of a Peircean kind) has the appeal of allowing an integration of the Theory of Knowledge, Natural Sciences and Hermeutics into a comprehensive theory of the evolution of culture. If this ever comes to fruition it would be by way of generating theory to guide empirical research. If that were ever to happen, a science of the genetic development of the varieties of experience could emerge.

Would such a science render obsolete *The Matrix* metaphor? I am afraid there cannot be a straight answer. On the one hand, we may say that the morphological structures resulting from evolution have the power of making the material appear as real. But on the other, if one only focuses on these structures there is little to say about the development of proper meaning. Meaning is a functional creature; it is product of culture and histori*es* (in plural). Put differently, any kind of socially shared knowledge results from communication within social practices. It seems to me that Inhelder and Piaget were right when they said (echoing Leibniz) that the real is a part of the possible (1955). It is by elaborating on the real that new rational devices could be developed, so that new meanings and new realities can arise. History is open to contingency; it is not reducible to pure necessity: thus, it leaves room for innovation and for choice. Or does it? It is the unsettling nature of this latter question that made me write histori*es* rather than History above. I have little doubt that if ever a single view of History – i.e. what really was, is and will be – becomes widespread within a global community, *The Matrix* will stop to be a metaphor. If that ever happens we would not even be able to question whether the reality we experience is virtual or real.

REFERENCES

K. O. APEL (1975): *Der Denkwerg von Charles S. Peirce. Eine Einführung im dem amerikansischen Pragmatismus*, Frankfurt am Main, Suhrkamp Verlag.
R. W. BYRNE & A. WITHEN (1988): *Machiavellian Intelligence*, Oxford, Oxford University Press.
F. C. BARTLETT (1925): «Feeling, Imaging and Thinking», *British Journal of Psychology* 16, 16-28.
A. GILLESPIE (2010): «The intersubjective nature of symbols», in B. WAGONER (ed.) (2010), *Symbolic Transformation. The Mind in Movement Through Culture and Society*, London, Rouledge, pp. 23-37.
A. GONZÁLEZ (1997): *Estructuras de la Praxis: Ensayo de una Filosofía Primera*, Madrid, Trotta.
B. INHELDER and J. PIAGET (1995): *De la logique de l'enfant à la logique de l'adolescent*, Paris, Presses Universitaires de France.
A. NEWBERG, E. G. D'AQUILI & V. RAUSE (2001): *Why God Won't Go Away: Brain Science and the Biology of Belief*, Ballantine Books.
C. S. PEIRCE (1933-1958): *Collected papers*, Cambridge, Harvard University Press.
— (2007): *La lógica considerada como semiótica*, Madrid, Biblioteca Nueva.

J. Piaget (1936): *La naissance de l'intelligence chez l'enfant*, Neuchâtel, Delachaux & Niestlé.

J. Piaget and B. Inhelder (1966): *L'image mentale chez l'enfant*, Paris, Press Universitaires de France.

D. G. Premack and Woodruff, G. (1978): «Does the chimpanzee have a theory of mind?», *Behavioral and Brain Sciences,* 1, 515-526.

A. Rivière & M. Sotillo (1999): «Comunicazione, suspensione e semiosi umana. Le origine della patrica e de la comprensione interpersonale», *Metis* 1, 45-72.

A. Rosa (2007a): «Acts of Psyche: Actuations as synthesis of semiosis and action». en J. Valsiner and A. Rosa (eds.), *Cambridge Handbook of Socio-Cultural Psychology,* New York, Cambridge University Press, 205-237.

— (2007b): «Dramaturgical Actuations and Symbolic Communication. Or How Beliefs Make up Reality», in J. Valsiner and A. Rosa (eds.), *Cambridge Handbook of Socio-Cultural Psychology,* New York, Cambridge University Press, pp. 293-317.

A. Rosa and J. Valsiner (2007): «Socio-cultural psychology on the move: Semiotic methodology in the making», in J. Valsiner and A. Rosa (eds.), *Cambridge Handbook of Socio-Cultural Psychology,* New York: Cambridge University Press, pp. 692-707.

Salvatore and Venuleo (2008): «Understanding the role of emotions in sense-making. A semiotic psychoanalytic Oriented perspective», *Integrative psychological and Behavioral Science. Special Issue: Consciousness within Communication: The Stream of Though Reconsidered,* 42, 1. 32-46.

— (2008): «The unconscious as symbol-generator: A psychodynamic-semiotic approach to meaning-making», in B. Wagoner (ed.) (2010), *Symbolic Transformation. The Mind in Movement Through Culture and Society*, London, Rouledge, pp. 59-74.

J. K. Sheriff (1994): *Charles Peirce's Guess at the Riddle*, Bloomington, Indiana University Press.

G. Sonesson (2010): «Here comes the semiotic species: Reflections on the semiotic turn in cognitive sciences», in B. Wagoner (ed.) (2010), *Symbolic Transformation. The Mind in Movement Through Culture and Society*, London, Rouledge, pp. 38-58.

J. Valsiner (2002): Irreversibility of time and ontopotentiality of signs, *Estudios de Psicología 23* (1), 49-59.

W. Wundt (1897): *Outlines of Psychology*, St. Clair Shores, MI, Scholarly Press.

Unversidad Autónoma de Madrid   Alberto Rosa Rivero
alberto.rosa@uam.es

[Artículo aprobado para publicación en octubre de 2010]