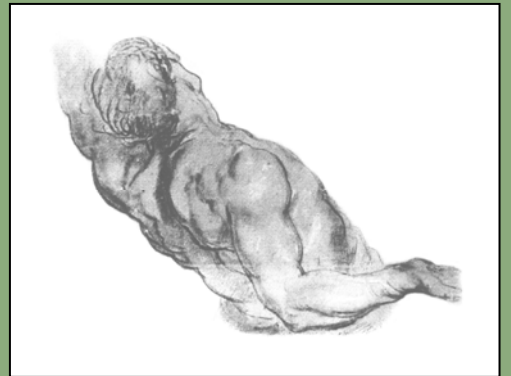


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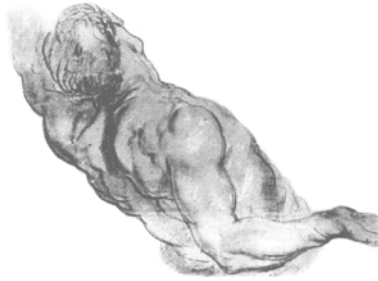


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USABP Mission Statement

The USABP believes that integration of the body and mind is essential to effective psychotherapy, and to that end, its mission is to develop and advance the art, science, and practice of body psychotherapy in a professional, ethical, and caring manner in order to promote the health and welfare of humanity. (revised October 1999).

A Topography of the Mind

Michael Coster Heller, Ph.D.

Abstract

In this paper, I will summarize a few points of my model of the *topography of the mind*¹. I will try to explain how I distinguish individual and shared awareness, resonance from intersubjectivity. The paper has two aims. The first aim is to present to psychotherapists a model which they can use in their practice, which is compatible with contemporary neurology and psychology. The second aim is to specify through which types of mechanisms it can be said that interacting with others is a necessary way of calibrating individual psychological capacities. I will focus on a few key elements of my model, leaving more detailed descriptions for future presentations.

Keywords

Intersubjectivity – Neurology

When we look at the sun, we imagine it as about two hundred feet away from us, an error which does not consist simply in this imagining, but in the fact that while we imagine it in this way, we are ignorant of its true distance and the cause of this imagining. For even if we later come to know that it is more than six hundred diameters of the earth away from us, we nevertheless imagine it as near. For we imagine the sun so near not because we do not know its true distance, but because an affection of our body involves the essence of the sun insofar as our body is affected by the sun. (Spinoza 1677, Book II, proposition 35, Scholium)

Epistemological Premises

The Levels of Matter

The general model of levels of matter allow one to situate atomic particles, atoms, molecules, cells, tissues, organs, organisms, groups, institutions, etc. It is assumed that each level is an emergence of the organization of elements of the preceding level. The most often quoted example² is that of water. A water molecule contains one hydrogen atom and two oxygen atoms. When oxygen or hydrogen is put in contact with fire, flames become more intense. But if water is poured over flames, flames diminish. This property cannot be observed when analyzing oxygen or hydrogen separately. Chemists therefore assume that the antagonistic association between water and fire is an emergent property derived from a particular type of *organization* of water and oxygen. Thus a system is not only defined by the elements it contains but also by its organization.

In the water example, we have a bottom to top reading of the levels of the matter; here is a top down example. To explain why certain cells of wood are situated under my computer while I am typing these words, a bottom to top reading would be useless. One needs to start with vague notions of evolutionary and social history, of the function of tables in general, and how a particular table became the one I like to write on today. This may also involve particularities of my own history. All these causal chains and many more are involved in explaining how a certain tree was cut and used to make a table, and how its cells arrived in a certain state at a certain location at a certain time.

When I was a psychology student in Geneva, I became interested in the fact that no one could situate psychological dynamics in the levels of matter. I also noticed that no one was exploring how the levels of matter were connected in a systematic way. A typical example of this issue was the debate on mind and body. Neurologists could show that some neurological lesions influenced what an individual was aware of, but they could not explain how nervous impulses created the impression one has when one is aware of a thought. The dominant model on this matter remains various forms of *parallelism*, in which one assumes that thoughts follow a causal sequence that is relatively independent from neurological ones. Although the capacity to count may have neurological logistics, one cannot explain why $2+2=4$ with physiological models. One was also beginning to notice that what one thinks, what one pays attention to, may influence how certain nerves connected with each other, or that certain ways of managing one's emotions could influence – via the nervous system – muscular tensions and even certain forms of physiological dynamics through mechanisms that were designated as “psychosomatic”. This led to intense discussion on whether one should mostly use a bottom to top conception of nature (e.g., everything is innate), or a top down set of procedures (e.g., social structures organize how organs combine).

My choice, in these discussions, was to focus on what was missing in these discussions: the assumption that there exist systems that regulate the levels of matter. Both Jean Piaget and Wilhelm Reich, who were the main influences when I was at the university, stressed that a human organism has many regulation systems, some of which are psychological. I

¹ This model owes a lot to long detailed discussions with George Downing and Philippe Rochat over many years, and to the stimulating presence of Daniel Stern.

² The metaphor was first used in psychology, to my knowledge, by Vygotsky (1934, p. 4), in an analysis of how thought and language associate: “It may be compared to the chemical analysis of water into hydrogen and oxygen, neither of which possess the properties of the whole and each of which possesses properties not present in the whole. The student applying this method in looking for the explanation of some property of water – why it extinguishes fire, for example – will find to his surprise that hydrogen burns and oxygen sustains fire.”

reformulated these discussions by remembering that an organism can be analyzed as a coordination of several levels of matter (atoms, cells, organs...), and included in others (a group, a society, a species, nature, planets...). Like food in my stomach, I have a set of particularities that can be more or less easy to digest for my environment. What regulates my organism is regulated by what surrounds me. The social environment I am in could not survive if individuals did not exist to sustain it. These thoughts changed my way of dealing with the current opposition between mind and body. I started to explore how a thought, a gesture, nervous and arterial dynamics could combine to form an organismal regulation system. I also wondered how these heterogeneous mechanisms could be integrated, or could influence, the interactions of which I was a part.

To summarize:

1. Intra-organism systems are formed by regulatory systems that connect atoms, cells and organs situated within a particular organism. I am assuming that particular psychological dynamics are a regulation of a wide series of heterogeneous systems that focus on tasks that are relevant for the organism taken as a global entity. This formulation does not imply that everything is linked to everything. Not all cellular activity participates in global organismal functions in a direct way (Kagan, 1998, pp. 22-23).³
2. The levels of matter in which an organism can be situated are groups, cultures, institutions, societies and ecological niches. The connections between an organism and events situated at these levels form the interactive and psychosocial dimensions of a person's psychological dynamics. Once again, the only relevant social dynamics for a psychologist are those events which have an impact on organismal dynamics, or which are sensitive to these dynamics.

I therefore assume that psychological phenomena have their roots in the organismal level of matter, and that they connect events occurring at this level with events one can situate at other levels (e.g., cells and institutions). I also assume that these systems are necessarily nonconscious. I designate as nonconscious all events a) that cannot be explicitly explored by introspection, and b) that influence the regulation mechanisms of an organism.⁴

Functionalism and Logistical Forms of Analysis

Functionalism is an intellectual tool that looks for functions common to structures that are materially different. For example, legs, horses, cars, boats and airplanes have a common function: that of allowing the displacement of human organisms. A logistical analysis will show that although legs and planes share a certain number of functions, they are not made in the same way, they are not connected to a brain in the same way, and they cannot be used in the same way. Psychologists often use logistical analysis to differentiate mechanisms that seem to have the same effect, but that are generated by different systems (e.g., for a logistical analysis of consciousness, see Kagan, 1998). It is on the common ground of their underlying logistics that I will differentiate individual and shared awareness, which is the basic theme of this article.

I will now describe certain logistical aspects of mental regulation systems, with the aim of differentiating what are sometimes referred to as individual awareness systems and shared awareness systems. The main difference between approaches of my generation (e.g., K. Uvnäs-Moberg, 1998; B. Beebe & F.M. Lachmann, 2002) and that of my predecessors is that I clearly differentiate inter- and intra-organism regulation systems. I was brought up in a tradition that assumes that psychological dynamics are mainly inter-organismal (Vygotsky, 1934; Piaget, 1967; Tomasello, 2003; and Rochat 2001), which is contradictory to many of the options I take when I work as a psychotherapist, or when I study how bodies participate in an interaction. In both approaches, one assumes that what happens inside an organism is connected to what happens around the organism, but in the Vygotsky-Piaget approach one tends to think of a single loop that connects the inner dynamics of several persons. For example, Philippe Rochat (2004, p. 277) assumes that awareness is not an "individualistic phenomenon" but "first and foremost a social construction that is negotiated with others". In the more modular approach that I have become familiar with, I assume that interaction is a system that can associate heterogeneous mechanisms which each have separate histories. The muscles of my arms may be included in the same system that allow me to pick up a baby, but these muscles also have a history that is independent of my relation to that baby. How to associate such heterogeneous histories as the gaze of the baby and the muscles of my arm in a set of equally heterogeneous interactive patterns is one of the tasks of contemporary psychology I am involved in. It is thus possible to surmise an association between regulation systems that are distinctly intra-organismal and others that are distinctly inter-organismal. It is in such a frame that I analyze how an individual's conscious experiences are calibrated and developed through social regulation systems, which themselves are calibrated and developed by individual dynamics.

Intra-organism Processes

³ This formulation is slightly different from what Catherine and Malcolm Brown propose in their theory for an Organismic psychotherapy (e.g., Malcolm Brown 2001).

⁴ Differentiating nonconscious and unconscious dynamics is a complex task I have elaborated elsewhere (Heller, 2004b). The crucial difference is that unconscious thoughts have been conscious and may become so again (e.g., during hypnosis). Nonconscious events can never become conscious. See also Pally, 2005.

In this section, I will review some well-known facts to show how complex they become as soon as one focuses on how they associate. I use the metaphoric notion of “editing” to designate how heterogeneous information is “translated”. For example, muscular activity regularly activates nervous activity. These two forms of activity are of a different nature, of a different format, with different underlying mechanisms, using different cells. Yet the association of these two activities participates in a wider set of regulation systems that coordinate breathing and blood circulation so that the muscle can operate in a relevant way. In this article I will focus how such editing devices participate in the formation of human individual conscious experiences, and how they also participate in the coordination of what several individuals experience.

Bit by bit, I will gradually show how I imagine that individual regulation systems actively connect with each other to form a variety of social regulation systems.

Cellular Communication

The transactions between an environment and a human organism are at first all nonconscious. Some are designed to reach psychological systems more directly than others. Cellular organisms such as germs and viruses flow in and out of the organism constantly. Those that can be harmful to the organism are often detected by the immune system, which activates defense mechanisms that do not involve psychological resources. When immune defenses are not sufficient to deal with these stimulations, symptoms such as colds and coughing are activated that instantly mobilize psychological and interactive mechanisms. Once the immune reaction is experienced as fever, help from neighboring organisms and medical institutions can then be mobilized. There is a fine point here. I am not saying that fever is designed to activate resources only conscious dynamics can mobilize, but that awareness systems necessarily detect events which involve the whole organism. More specifically, consciousness detects some aspects of generally nonconscious forms of global organismal regulation systems. This is a bottom to top description of a system that also has top down causal chains (e.g., being anxious may influence some aspects of immune dynamics). The modular model I am using assumes that there is no direct route between a thought and cellular dynamics, but that a wide variety of small, relatively independent intermediary mechanisms can influence each other in a variety of ways (Heller, 2005a). I surmise that it may for example be the same structure which produces a conscious impression of a moving arm, and which activates a sensory-motor circuit which produces a correlative arm movement. In the case of a cold, we already have two types of communication systems:

- a) Communication between external cells and a physiological system capable of detecting cells that were not fabricated by the organism. As in all biological mechanisms, the system does not have a perfect fit, as errors are not rare (as in cancer and immune diseases).
- b) Chains of organismal reactions that respond to whatever has been detected by the immune system.

Sensorial organs are different from immune reactions in the sense that they are designed to associate non-neurological events with neurological response systems. One of the functions of a brain is to centralize information coming a) from most parts of the organism and b) the environment, to organize a system of response that can coordinate a wide variety of systems to accomplish a task that requires global organismal resources. Psychological dynamics seem to be one of the emergent systems based on such a global coordination of specific distinct mechanisms.

Objects and Sensorial Organs

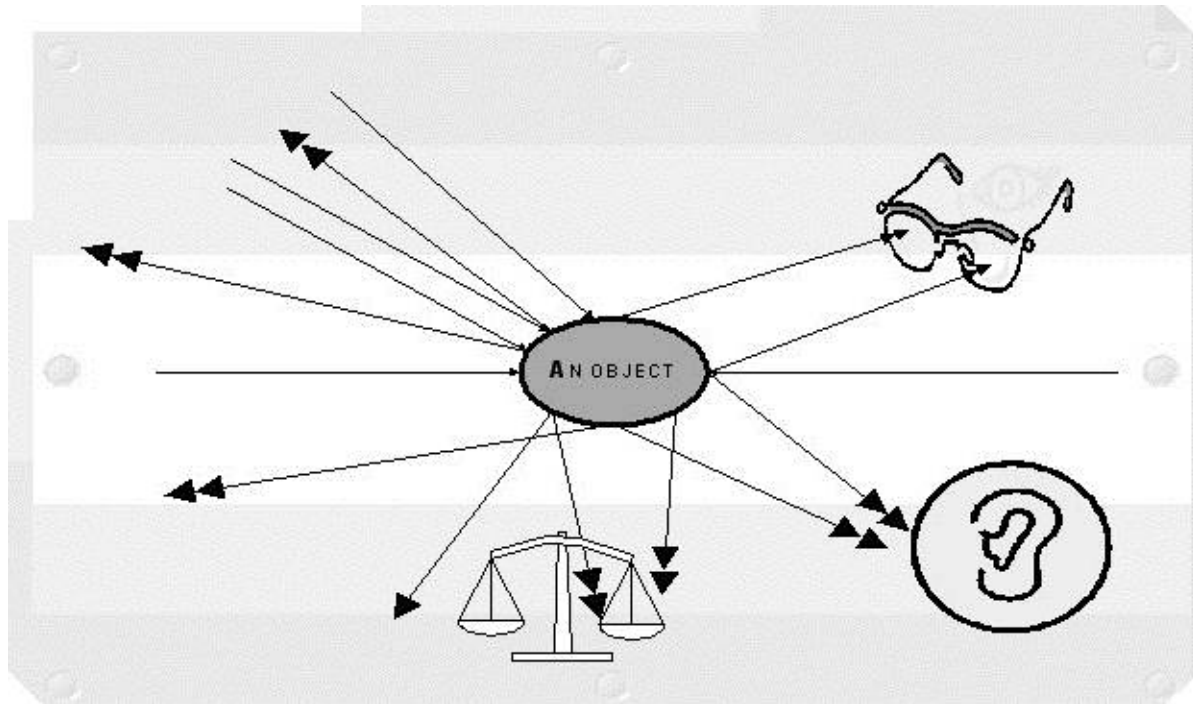


Figure 1: A perceived object

An object is situated in a vast chain of physical and chemical causes and effects. Some of these effects are grouped by a sensorial organ and transformed into nervous impulses. From the point of view of the object this grouping is partial and arbitrary.

Objects are inserted into a web of causes and effects that we humans cannot comprehend. Senses select some effects of an object and define them in terms of the function of the mental operations they are capable of activating. The retina, for example, is sensitive to what scientists define as wavelengths. Not only does the retina react to this effect of an object and no other, but it also reacts to it in a particular way, as some wavelengths activate certain cells that create the conscious perception of redness, while others are grouped to form an impression of blueness. Cats and dogs also perceive wavelengths humans do not react to. An object may also create modifications of air pressure. The human ear responds to air pressure modifications by classifying some as a deep tone and others as a high tone. The categorization systems used by organs are arbitrary.

There is no way a scientist can list all the effects of an object, as humans can only detect those that have been recorded by their organs and their machines, using categories that fit their mind, not their environment. Sensorial organs select a few physical indices that can be managed by the brain, and then transform these indices into nervous activity. The advantage of this strategy is that a wide variety of information is finally reduced to a single format of signals that the organism can digest and associate.

This is for me the first layer of editing systems used by the brain: external physical events are translated into specific neurological dynamics using a coding system the brain can deal with. Certain electromagnetic waves are, for example, “translated” in brain dynamics that will be experienced consciously as redness. This translation does not imply that an object is red, but only that redness correlates with how magnetic waves bounce on the object.

Basic Neurological Algorithms

Senses filter information by being sensitive to particular events, which they automatically transform into nervous impulses. A second layer of neurological editing systems classifies these nervous impulses into events the organism can react to. To achieve this task, the simplified data that enters the nervous system is transformed into a vast quantity of *derived nonconscious inferences*. This task is managed by a variety of highly specialized modules. Each module uses a particular algorithm to transform a local neurological activity into another set of nervous activities. The term “local” designates the fact that a module is only sensitive to activity that occurs around it, and generates a particular form of nervous activity in the same

area of the brain without having the capacity to sense how what it produces will be used. These reactions form a first level neurological database. Some are sensitive to contrasts and colors, which allow others to extract shapes and identify objects. Another set of modules is sensitive to variations of activity in some optical nerves. Among these, some will infer that a certain shape moves, and another will compute in what direction this shape is moving at a particular moment.

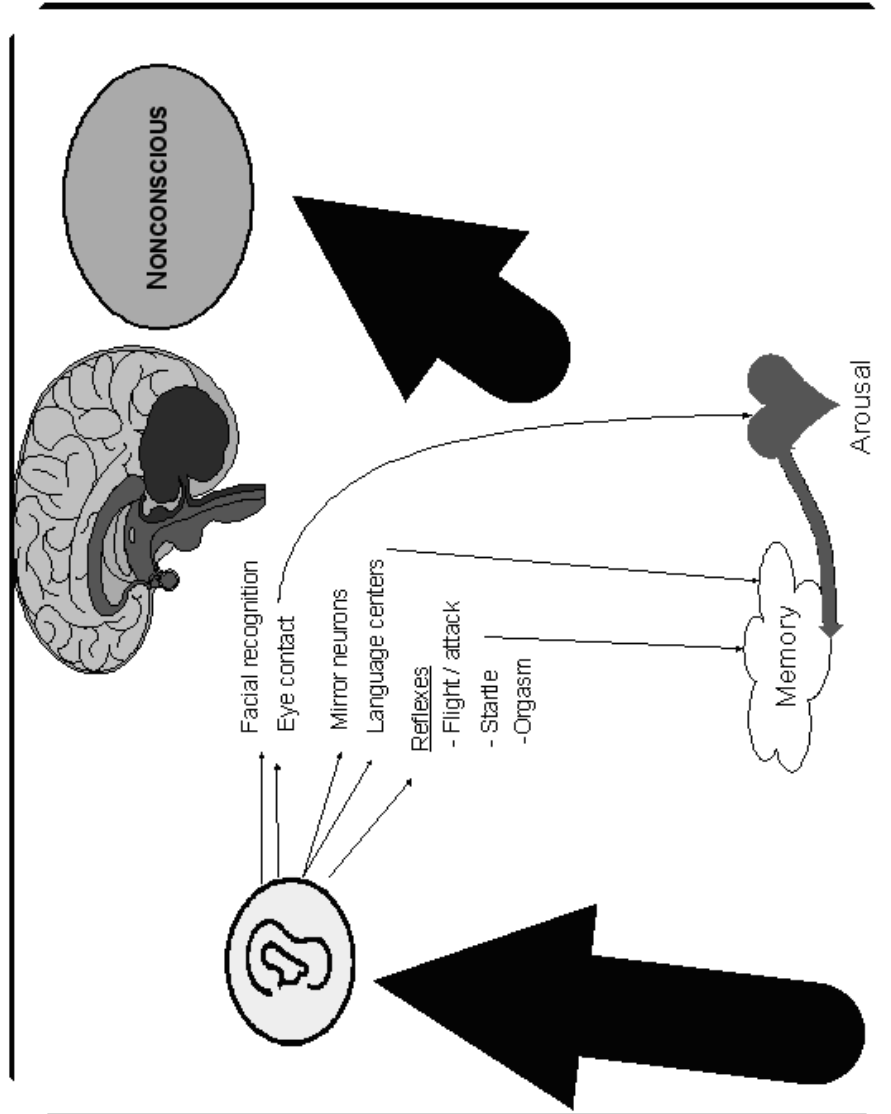


Figure 2: Sensory filtering

Sensorial organs filter and reduce physical data in a common nervous format that can be used by a multitude of nonconscious activators. These activators multiply the data in function of their own criteria. I have drawn thick arrows when the influences are numerous and heterogeneous.

Some of the activity produced by these modules will be detected by other layers of modules that are sensitive to all the shapes that resemble a face, and differentiate those that are faces and those that are not. Those shapes that are assimilated to faces will then be analyzed by a variety of modules that will distinguish familiar faces from unfamiliar faces, hostile faces from friendly faces, etc. Each of these modules thus produces a series of analyses that interpret what has entered the organism in a particular way, and produce information that is not contained in the original data. *These nonconscious* inferences transform one set of data into thousands distinct sets of data. Each algorithm is simple, but as they are numerous, they can generate a complex, multi-faceted reconstruction of the environment. Artificial intelligence has shown that simple algorithms can generate highly complex data structures, and that small modifications of algorithms can generate incredibly different results (Wolfram, 2002). Thus, the genetic code of flies and humans are quite similar, but the small differences that exist are enough to generate the immediately recognizable differences between the two species (Jacob, 1998).

These layers of nonconscious algorithms are situated all over the brain, and are regulated by the whole organism. They are associated with hormonal and cardio-vascular activity⁵. One can now distinguish a third layer of modules capable of

⁵ Some methods used by neurologists detect which parts of the brain are active at a certain moment by detecting how parts of the brain are being irrigated. For example positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) assess relative changes in brain metabolism and blood flow.

generating behavioral patterns, such as a startle, flight or attack or orgasm reflex. The onset of these reactions is so rapid that conscious dynamics do not have enough time to become involved. They coordinate most physiological organizations toward an aim: breathing, cardio-vascular dynamics, skeletal muscles, etc. Only the more massive behaviors elicited through these layers of mechanisms are automatically detected by consciousness. Most automatic behaviors are highly rapid and local regulations, which function at low intensities. These can only have a nonconscious existence (Heller, et al, 2001).

These subroutines generate a vast quantity of usable information. A small percentage of this information is used to generate immediate responses, while another small percentage is edited for awareness. However, the neurological studies of these forms of data management only detect nervous activity, muscular activity, various hormonal dynamics, and modifications of how blood supplies are distributed in the organism. Neurologists have found nothing that amounts to an explicit form of representation or judgment. One can literally take what happens at this level as signals in-formation, or as a first level of implicit information that can be used to shape various forms of awareness of what is happening.

Awareness is itself composed of slightly more complex algorithms, which I call *awareness devices*. These devices generate a wide range of psychological events that are reflexive. We know, through introspection and studies of neurological lesions, that there are many kinds of awareness systems. Some devices create forms of inner verbalization, others inner images, inner sounds, inner sensations of movement, etc. These awareness devices select some of the information that circulates in the organism, and edited in something awareness devices can deal with. Each device has a different point of view, summarizes data in a particular way and offers a differentiated set of possibilities. The selection of information for each device, and why a device becomes more prominent at one moment and not another, depends on a vast quantity of variables that are managed nonconsciously, following rules on which psychologists and neurologists have only limited information.

Freud had already used the geological metaphor of neurological layers. This metaphor is useful to create a first general impression of the complexities of physiological data management, but one then needs to set that image aside. There are no neat neurological layers, but rather a set of subroutines. Some have highly specific functions, others general ones⁶. One may find modules that have different functions and aims in the same area of the brain, or modules that often associate in different regions. A routine with a highly specific action may be spatially close to another that has a more general influence. The thalamus is a structure containing substructures that edit visual information, activating certain forms of fear and pleasure responses. This partially explains how one can be afraid while one is experiencing intense sexual arousal.

Awareness Devices and Attention

There are two formulations that are wrong, in my way of thinking:

- a. A human can have conscious thoughts.
- b. A human can become aware of how he thinks.

Such expressions require some reformulation, as soon as one assumes that a psychological process is a nonconscious dynamic that may include a variable number of awareness devices a certain number of times. Take the explicit formulations of “2+2” and “=4”. Adults associate these two formulations relatively easily. They are automatically associated by awareness devices when one follows the other. Although this association can easily be explained, most of the time it is spontaneously constructed by nonconscious systems⁷.

When one teaches a young child to count, one sometimes needs more than a rapid association between two awareness devices. For example you may ask a child to stretch two fingers on one hand, two fingers on the other hand, and then to count all the stretched fingers. In this case, each stretched finger requires at least one awareness device, and also the counting of each of the four fingers. This operation thus requires at least ⁸ awareness devices, which can each be composed of several awareness modules. In such a learning context the “2+2” and “=4” process requires a greater number of awareness devices, more attention, a greater effort and more organic energy than when they are automatically associated. Attention can thus be measured by the number of awareness devices and the quantity of energy used. Each conscious step is necessarily linked to the others by a web of nonconscious processes that no one can perceive through introspection. One may have indirect information on how these nonconscious processes functioned through impressions of ease or effort, but one cannot know by introspection what nonconscious steps were used to link these awareness devices. The implication is that even the most logical chains of thoughts are composed of islands of awareness in an ocean of unconscious regulations.

⁶ In a computer program one finds subroutines which manage a specific algorithm. One subroutine transforms existing characters in italics, another helps you to choose on which medium you want to save data and a third one manages how much memory is available for the basic routines of the computer. In this example the first subroutine has a more specific function or target than the third routine.

⁷ The same can be said of most habitual conscious chains of thought.

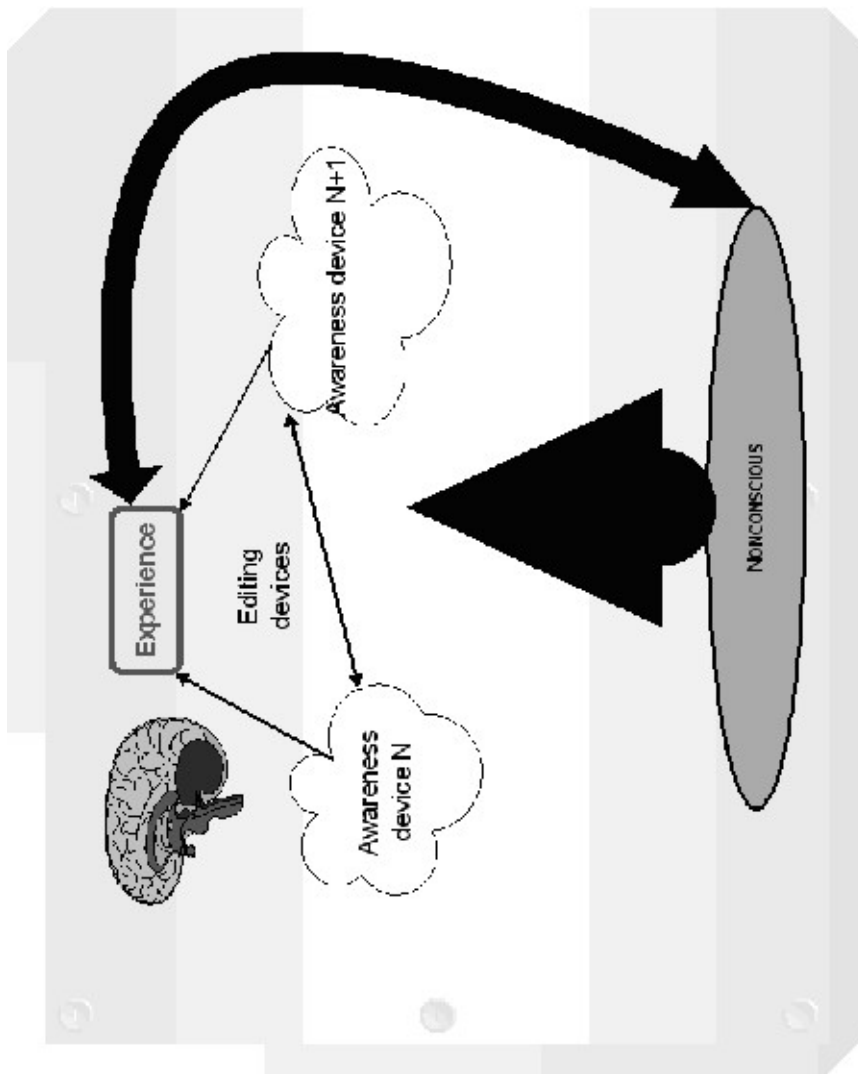


Figure 3: Conscious experience is produced by nonconscious regulation systems. I have drawn thick arrows when the influences are numerous and heterogeneous.

A mental mechanism that recruits awareness systems is like an iceberg floating in a sea of nonconscious mechanisms. From the point of view of awareness systems, the tip of the iceberg may already be impressive, but the nonconscious dimensions that regulate a conscious experience are incredibly complex, as they involve not only body dynamics, but also those of interaction and cultural know-how.

The implication of this model is that it is impossible to have a part of one cognitive system that observes the nonconscious dimensions of a thought. Although costly for the organism, it is possible to have one part of one's mind that can observe the conscious steps followed by an inner behavior. This is more easily done when one combines personal experience with the experiences of others, as in psychotherapy, meditation schools, or when in love. This theme will be developed in the sections of this article that discuss the notions of "resonance" and "intersubjectivity".

Necessary Awareness Illusions

Before the impact of an object has been edited to represent what you experience when you look at it, physical signals have traveled from the object to your eyes and have been transformed into nervous activity by thousands of modules. A conscious perception is only experienced after this work has been done. This experience is edited with impressions that allow you to perceive the object with a certain level of comfort. Nonconscious editing devices have fabricated this comfort by automatically eliminating a certain number of complex issues from spontaneous awareness systems. For example, you are not spontaneously aware that your experience of what you perceive is a construction that can only have a partial similarity to what Martians, with other sensorial organs, would perceive. On the contrary, your experience of this text is spontaneously produced with an inbuilt conviction that what you perceive is what is on the paper. This conviction is what I call a necessary awareness illusion.

that has been detected by nonconscious modules. However, this process is necessarily costly for the organism, which explains why humans tend to avoid using intense forms of awareness often.

Shared Awareness

*We put thirty spokes together and call it a wheel;
But it is on the space where there is nothing that the usefulness of the wheel depends. ...
Therefore just as we take advantage of what is, we should recognize the usefulness of what is not.
(Tao Te Ching, 300 b.c., Chapter XI, p.155)*

In the previous sections I pointed out how heterogeneous the mechanisms of an organismal psychology are. The human mental apparatus requires numerous editing devices that allow these varied mechanisms to associate with a minimum of comfort. I will now show how it is precisely this diversification that has left room for the incredible communicative capacities developed by the human species.

When I analyze interactions between two individuals, I not only analyze the causal chains that can be observed between two organisms, I also assume that these causal chains are organized by emergent properties that form a new level of matter that can be addressed as a system (e.g., as in family therapies), or a particular sort of group (e.g., a family, a team, etc.)⁹. The theoretical implication is that the gestures and words that can be observed when two people interact are framed by how the regulation systems of each organism connect with the group's regulation systems. Given my definition of psychological systems, this is the minimum frame required for the development of a psychological system, which necessarily involves organismal regulations. A sentence or a set of gestures is regulated by a) the needs of an individual organism, b) its impact on others, and c) implicit and explicit rules of the group. This necessarily involves the organisms as global systems, in which verbal and nonverbal items, psychological and physiological dynamics are intertwined. If the possibilities offered by dynamics that actuate heterogeneous mechanisms did not exist, I cannot imagine how the association of intra- and inter-organisms to form a system could be possible (Beebe, et al, 2002 & 2005a; Heller, 2004a).

Individual awareness is a set of reflexive experiences constructed within an organism, while the sharing of conscious thoughts requires a particularly complex set of mechanisms that connect organisms. The difficult part of this complexity is that associations between organisms are necessarily nonconscious, as awareness can only exist, as far as we know, in individual awareness systems. Thus, what psychologists such as Michael Tomasello designate as "shared awareness" is another illusion that facilitates transactions. When I talk with someone I know well, editing systems create the impression that we spontaneously have the same sort of representations in our individual conscious systems, as if individual awareness systems could contact each other directly, using words and gestures as a common support to convey meaning. However, as soon as one analyzes the logistics of such a communication system, one realizes that editing systems protect individual conscious systems from dealing with a wide range of complexities. If these editing devices did not exist, we could never manage to focus our attention on a particular set of transactions, which is often about all individual conscious systems can manage. The speaker cannot be aware of and does not know the global physiological mobilizations that allow a spoken formulation to actuate itself, the thousands of body micro-gestures that contextualize a meaning, and the vocal refinements that modulate the impact of a message.

One of the difficulties is that no particular instance has a global view of what is happening, and how it actuates. It is not only individual consciousness that does not perceive or imagine how it can function. Nonconscious processes do not have a greater capacity to access or create global representations of what is happening. All we have, according to present theories, are local systems of actions that activate themselves when certain expected local activities occur. As far as I know, social conscious construction (e.g., a scientific manual) is about as global as we can get.

One set of parameters that allow individual awareness systems to form a web of reflexive systems is that most human organisms have similar structures and similar awareness devices. My perception of a rose is relatively close to your perception of a rose. However, there are no two organisms that manage information exactly the same way. The differences are strong enough to explain why two organisms may react differently to an identical stimulus. This may explain why, since at least the appearance of ants, various species have sought ways to tighten this intra-organism variability through mutual regulation systems.

Resonance and Intersubjectivity

The human body is composed of a great many individuals of different natures, and so, it can be affected in a great many ways by one and the same body. And on the other hand, because one and the same thing can be affected in many ways, it will also be able to affect one and the same part of the body in many different ways. From this we can easily conceive that one and the same object can be the cause of many contrary affects. (Spinoza 1677, Book III. Proposition 17, Scholium).

Resonance

⁹ A typical example is gestures that respond to each other simultaneously (e.g., Beebe and Lachmann, 2002, p. 97; Jaffe, et al, 2001).

Two pendulums hang in space. One begins to swing, and the movement is conveyed to the other. The second pendulum begins to take up the influence of the first. (Boadella 1999)

I say this in general, that in proportion as a body is more capable than others of doing many things at once, or being acted on in many ways at once, so its mind is more capable than others of perceiving many things at once. (Spinoza 1677, Book II, Demonstration 13)

David Boadella (1987, 1999) proposed the term “resonance” to designate the global impression that nonconscious regulation systems are connecting inner impressions between two organisms, influencing awareness systems in ways that remain implicit. “Resonance” resembles the notion of atmosphere: a fuzzy global impression that somehow characterizes the buzzing activity of an organism at a specific moment. Atmosphere and resonance are a form of perception through which an organism can summarize the general activity of the organism for individual consciousness. Its contours are hazy, but the quantity of information that is conveyed is immense. It seems that the more explicit an impression is, the less information it contains. Resonance, as I understand it, creates the nonconscious logistics that can support the construction of an intersubjective experience. Resonance designates a series of nonconscious regulation systems that allow various forms of nonconscious attunement among several organisms. One set of mechanisms that allows various forms of mutual resonance are modules that have survived because a) they are sensitive to specific cues that emanate from other persons, and b) they can be used to activate an acceptably relevant response system.

I have already mentioned a set of modules that analyzes faces and some of their mimics. An often-quoted example of such response systems is Tiffany Field’s 1981 observation that eye-to-eye contact between two organisms increases arousal and heart rate in both organisms. An organism automatically avoids an unpleasantly intense arousal level by looking away. Arousal then lowers automatically, as well as heart rate.

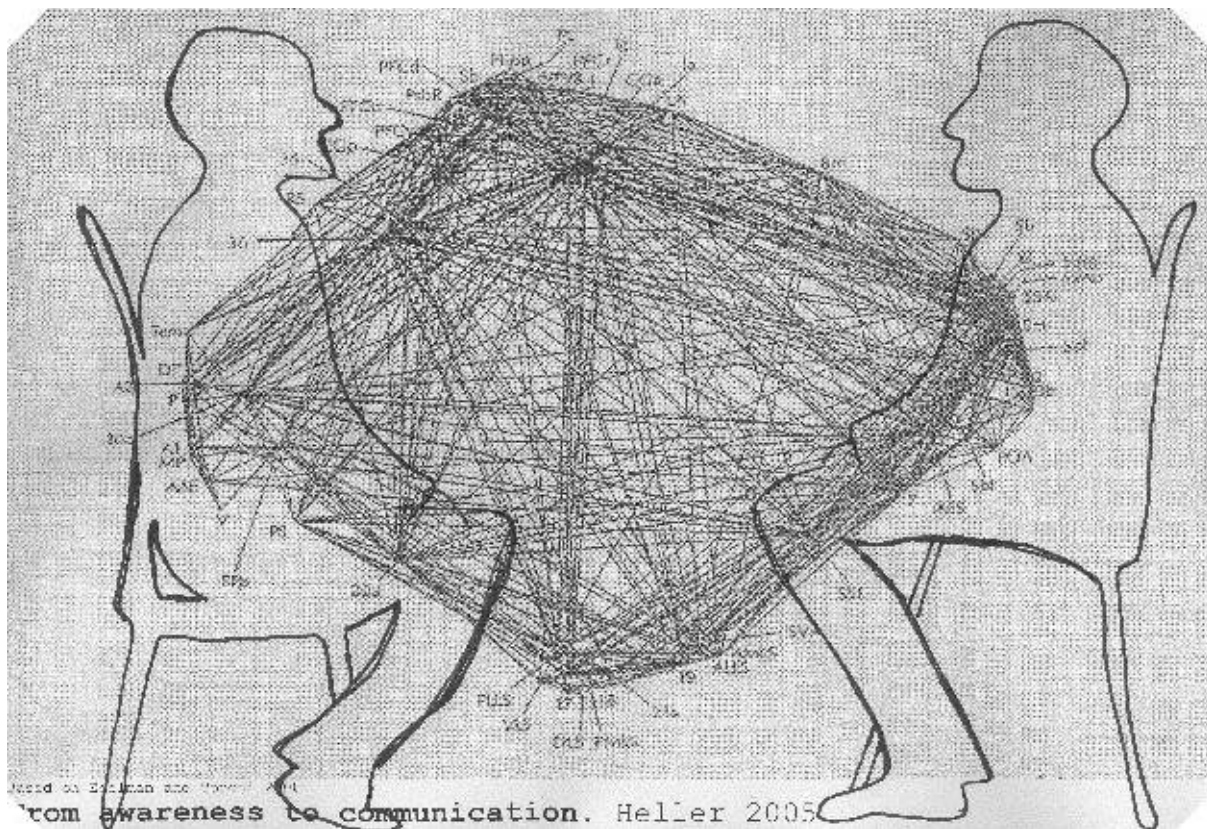


Figure 5: Nonconscious resonance between two organisms

Another set of spontaneous nonconscious activations are those known as mirror neurons, observed in the frontal lobes of macaques. It is assumed that similar neurons exist in a human brain (Gallese et al, 1996.). These neurons are activated when modules have detected that someone is trying to grasp an object¹⁰. When this happens, the organism activates the motor system it would have used to grasp this object in the same way. This is a typical example of what I call a resonance effect:

¹⁰ Only a few specific actions such as grasping objects trigger mirror neurons. Colleagues have a tendency to generalize and suppose that everything that is perceived creates a correlative psychophysiological inner construction. This has not yet been showed to be true by neurologists.

1. It is nonconscious.
2. It is rapid.
3. It is an inner reaction to what another person is doing.

When mirror neurons are activated, the person in whom this activation occurs is not aware that this is happening. But if, for other reasons, this person wants to imitate the other, he may feel more pleasure and more ease in imitating him than if he did not have mirror neurons. For example, let us consider children who pass through a phase of wanting to imitate what others do. Psychologists¹¹ have showed that there are many reasons why imitation is required by a child's developmental systems. Within this galaxy of mechanisms, mirror neurons may be a form of facilitator when imitation involves grasping an object. The implication for awareness systems is that mirror neurons may eventually modulate impressions in a subtle implicit way.

In the case of mirror neurons, we have an example of a form of resonance that does not require the participation of awareness to complete its task. However, there are many interactive regulation systems that require the participation of awareness systems. Instincts and emotions, for example, can only find relevant forms of expression if awareness participates in their attempts to achieve certain aims. These aims (e.g., organizing a meal) often require the coordination of several conscious organisms and a capacity to create a set of shared conscious constructions¹².

My definition of resonance is slightly different from that of Boadella and his colleagues, as they do not need to differentiate the nonconscious from the conscious. For example, in John Watkins' 1978 formulation, quoted by Boadella, resonance can be accessed consciously in explicit ways:

Resonance is that inner experience within the therapist during which he co feels, co enjoys, co suffers and co understands with the client. Resonance is a type of identification which is temporary.

In such a process, I need to distinguish four phases:

1. The nonconscious regulation system between two organisms.
2. The editing of the multitude of activities the interaction generates in the therapists, which leads to a sort of inner atmosphere than can be accessed in a fuzzy way through introspection.
3. A conceptualized metaphor of what is happening.
4. The edited illusion that this metaphor and its associated inner atmosphere corresponds to an intersubjective bond between two organisms.

These four steps are not explicitly distinguished in Boadella's model, which is why I use the term resonance to designate the first step mainly, and eventually the second¹³. I will now focus on the last step.

Intersubjectivity

From at least the second month of life, nurtured by caretaker's compulsive empathy towards them, the infant's psychological development is shaped around the innate drive to promote fusion and intimacy with others via active seduction as the antidote to separation. It is in this primordial context that human and possibly other animals' awareness develops. (Rochat, 2004, p.278)

These numerous influences affect the body in many ways, and increase or diminish its power. Affects are then generated to create a general attitude of body and mind that allows an organism to deal consciously with what is happening: The more Reality or being each thing has, the more attributes belong to it. (Spinoza 1677, Book I, proposition 9)

One of the reasons why I have presented my material this way is to combat the notion that two individual awareness systems may have direct contact with each other. This position is often presented using Daniel Stern's notion of intersubjectivity. Although one may have the impression that one's conscious thoughts are in direct contact with another person's thoughts and feelings, this impression is necessarily an edited experience. All the complexities of the interaction have, at such moments, been excluded from conscious perception so that individuals can focus their attention on some dimensions of a relationship. The telephone is a good example, as it reduces vocal patterns to electrical patterns that pass through complex cabling systems, which can then be decoded as voice and speech by a telephone that is maybe a continent away.

Examples of relationships in which the impression that strong forms of intersubjective experiences exist are those of love — between lovers, children and parents, friends, etc. Moments when it becomes obvious that the impression of intersubjectivity is an illusion may be a divorce, when the husband explains to you that he never could have imagined that his wife would demand her share of the family fortune with so much greed and hate; or when a parent discovers that his teenaged child is on drugs. The parent then typically says that he could never have imagined that this child they have raised and known for so long could have developed such a secret life. A common notion in such situations is that someone is discovering that a

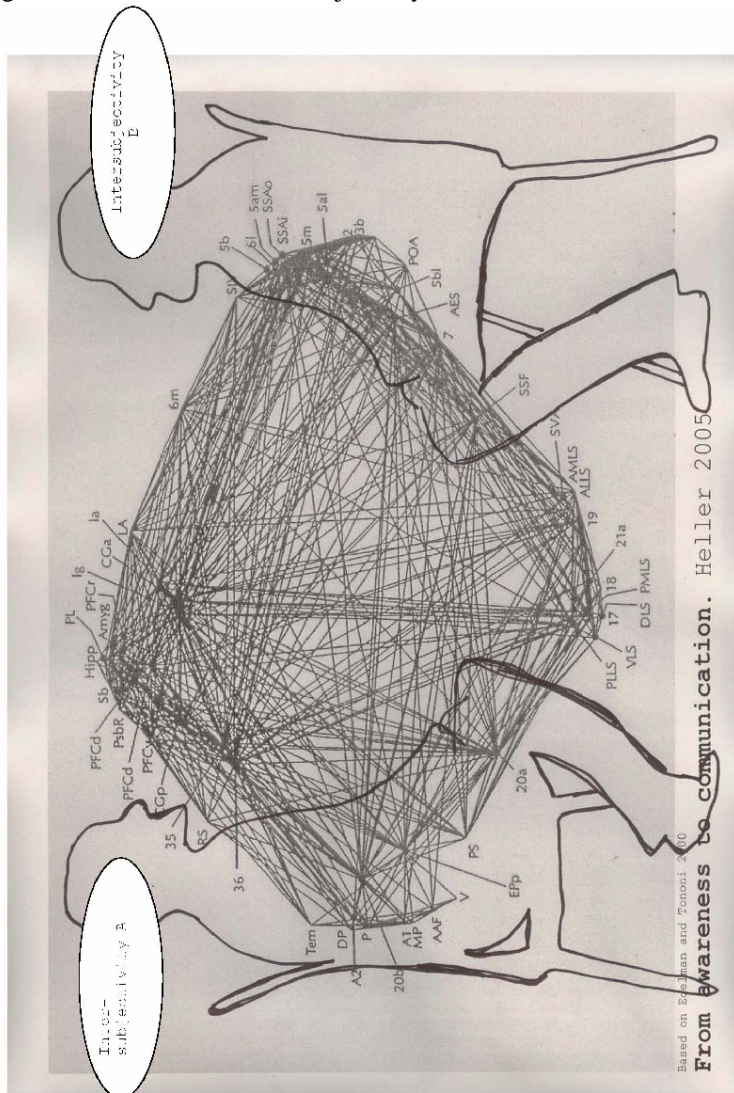
¹¹ E.g., Tomasello, 1999; Rochat, 2001 & 2004.

¹² I have detailed this part of my model in Heller, 2005b.

¹³ Rubens Kingel, 2005, shows that the term « resonance » is used in a variety of ways in various fields related to psychology such as neurology. I base my own definition on this discussion.

person who was experienced as an intimate partner is in fact a total stranger.¹⁴ When love is experienced, intersubjectivity is automatically experienced, but this comfortable impression, which can be blissful, is nevertheless a form of consciousness constructed by the nonconscious coordination of two aware systems.

Figure 6: Resonance and intersubjectivity



Language, emotional expression or table manners, and all such psychosocial phenomena are structured by nonconscious processes, which require various forms of calibration only awareness devices can provide. Communication is thus built on an immense series of small, specific inter-organism regulations that calibrate intra-organism regulations in such a way that some sort of common representation can be constructed in several organisms.

If intersubjectivity is a need, and if it is one of the properties of love, then love is a sentiment that mobilizes all the awareness systems and nonconscious systems, which will allow a form of intense exchanges between two organisms. Because love requires an intense intersubjective experience, it will require of the organism that it spend as much time and energy as possible to think and dream of the other, to explore the other with all its interactive capacities. The impression of intersubjectivity may be a necessary illusion, but - because it is necessary - it will increase the speed and quality and duration of nonconscious interpersonal regulation systems, of inter-organism resonance systems, and thus create a database that can support a need for maximum intersubjective experience. The pains of divorce result when the illusion is no longer supported by such intense nonconscious involvements, and when other forms of necessary illusions have not developed to support transformations of the relationship.

Secrets are the unconscious dynamics of shared awareness

¹⁴ A more detailed description of this phenomenon can be found in Bateson, 2000, pp. 3-18.

One of the many implications of this model for psychotherapists is a re-evaluation of secrets. Secrets are active in some awareness systems of a group but not in all. Their participation in the systemic dimension of a group is therefore nonconscious. Their existence is sometimes of utmost importance for a group, but their impact is so deep that disclosing a secret to all members of a group will impact the dynamics of the group and how each individual relates to the whole group.

Consider the following vignette:

A woman has three children with her husband and then a child from her husband's brother, with whom she has a long-term affair. The father accepts his role as the fourth child's official father. He agrees with his wife that they should live in the same house until the youngest of his three children is 11 years old. The three older children do not know what is happening, but they cannot avoid noticing that suddenly their parents sleep in two rooms, and that they have a younger sister a few months later. They are told that the father is so busy he does not have much time for holidays. Thus, they spend short holidays with their father and mother, and the rest of the time with their mother and uncle. The children are told nothing of what is really happening, and never see their uncle sharing tender gestures with their mother.

The main impact I observed on the second child, when she became my patient, is a persistent mismatch between what occurs in a room and the conscious representation that emerges. This led to a wide range of small noticeable maladjustments. She had an unconscious propensity not to perceive what might disturb her parents, and increase their guilt. For example, her parents speak several languages and often use foreign languages to communicate on touchy matters. She developed a phobia to learning languages. She also had suicidal thoughts associated to the impression that she is not the daughter of her mother. She does not understand why her parents quarrel so violently on trivial matters, such as how meals should unfold. She cannot know that the parents' aggressive feelings look for "official" pretexts for anxieties that have other causes.

She developed communicative handicaps that inhibited her capacity to relate smoothly with others. These handicaps take non-verbal forms as much as verbal ones. In her profession, she tends to compulsively avoid reaching clear aims. She came to see me with the unconscious hope that by passing through the body I might reach the truths she refuses to perceive consciously. However, as her body expressions were associated with distorted truths, I reached false conclusions. Finally, by working verbally on the family history, I managed to clarify what was happening, but by then the therapy had already lasted five years, and the patient stopped. We discovered that her father had been raised in a similar situation, and that he found adaptation to secrets "normal". Having discovered these events, we managed to reconstruct the secrets of her own childhood.

As her parents also had numerous positive qualities, the trauma induced by the secret situation was compensated by constructive support systems. I will therefore not support the idea that secrets necessarily produce schizophrenia. However, there were certain schizoid traits in this patient, who somehow never found ways of putting brain, body, emotions and sexuality together. When she came to see me a decade later, for a few months, she was at last becoming aware of a strong anxiety she had always denied. She had managed to discuss the whole affair with her parents, and was no longer afraid that her incompetencies would raise her parents' guilt. Her creativity was finally able to reach relevant aims more easily, but not completely. Her love life was more structured, but not necessarily satisfying. The odd impression that her inner needs were aiming at an unreachable horizon persisted. In a certain way this is true for everyone, but in this case, the dilemmas had a harsher impact than on other members of her social environment.

I have developed this case to show that secrets and individual unconscious memories are distinct, although they influence each other; and that it may be useful to explore more fully than usual, and more often, the particularities of the impact of secrets. Individuals who grow up surrounded by the implications of secrets learn to trust explanations that fit all the explicit conscious information they have, but which ignore more implicit information such as the productions of inner and external atmospheres. They thus acquire the skill of surviving in situations with particularly inadequate models. This "skill" is developed at the risk of become insensitive to intrusive and obnoxious behaviors. They also tend to accept from others treatment that is experienced as insulting in their cultural environment. They thus develop interactive skills that are often detrimental to their survival in their social environment.

The Institutional Developments of Individual Consciousness

For the sake of completeness, I now summarize the third layer of my topography of the mind — the social layer. Language, culture, science, arts and religion are examples of constructions that require institutional dynamics as well as those already mentioned in this paper. My central idea on how individual and institutional dynamics are coordinated to form a third type of coordination between different awareness systems is that humans have developed devices for awareness, such as

books, televisions, computers, etc. Leroi Gourhan's (1964) idea is that these devices externalize and refine functions that exist in a human organism. Fine motor skills and fingers can handle objects in a variety of ways, but hammers and saws considerably enhance these capacities. Legs can be used for displacement, but with horses and airplanes individuals can travel all over the planet. The brain has the capacity to store information, but books and computers allow individuals to share memorized information even when the individuals who gathered the information have died. This coordination between individual awareness systems and devices for awareness is possible because awareness modules can be connected by nonconscious systems that have the capacity to be linked to regulation systems situated outside of the body. Institutions have emerged with the capacity to include devices for awareness in inter-organism regulation systems.

For a fish or a rat, a book is nothing but an object. However, for apes a tool can modify an individual's or a group's adaptation to its environment (de Waal, 2002). Humans have developed tools that can convey memorized information to the nonconscious procedures that edit individual consciousness. They developed this possibility in a unique direction, which even gives them the capacity to destroy the whole planet. Through science, individual awareness systems may become aware of how their organism functions without being blinded by the limitations of their introspective powers. Science on the other hand cannot access the type of information introspection can provide to individual awareness systems. The combination of these two sources of knowledge has played a crucial role in the development of spiritual and artistic imagination. They are also crucial to the development of psychology and psychotherapy. A psychotherapist combines the powers of institutionally produced knowledge, with elaborations that can only be produced through an interaction, and the powers of two (or more) introspective dynamics. The fact that such a combination helps to calibrate moods, emotions, and self-awareness is, in a way, the proof that my model corresponds at least roughly to certain dynamics involving the mind.

A generally intriguing issue highlighted by this model is the status of an individual reflexive process that participates in institutional dynamics that are necessarily nonconscious. This makes it difficult for an individual to situate himself in his society or tribe. To be able to situate oneself, an individual consciousness would have to be able to perceive what is happening from outside of the organism, in a place from which an individual mind could observe not only his body, but the whole social context in which it evolves. This is of course impossible; hence, the immense amount of literature written about an individual's dependence on information and impressions provided by others.

Conclusion: Individual and Shared Awareness

By 9 months and with the onset of locomotion, infants become jointly attentive to objects and events in the world, in other words, attentive with others. If an infant plays with an object, she will start to check with quick back-and-forth glances between the object and the social partner, actively monitoring whether they are both interested in the same thing. (Rochat, 2004)

To summarize my theoretical position I situate the capacity to create reflexive thoughts in individual organisms only, but this capacity only becomes meaningful and useful for the species once it can be inserted in a nonconscious web which allows co-constructions of shared material in a multitude of individual awareness systems. It is this capacity which is particularly complex in the human species. I think that combining individual and shared awareness is a key element of psychotherapy. Research by Wilma Bucci shows that when communication becomes multimodal between a patient and a therapist, the psychotherapeutic relation is often productive. Multimodal means that a gesture can be answered by a sentence or a sentence by a gesture. In other words, the content of an awareness modality is not only comfortably translated from another modality within a person, but also from one person to another. Daniel Stern (1985, p. 145) sometimes used the term "resonance" to designate forms of attunement between expressive modalities, which can recast an "experience into another form of expression".

It would seem that a process of awareness-driven co-construction helps. Individual awareness systems tend either to forget experiences as soon as they begin, or to get stuck in recurrent reformulations that prevent new experiences from forming themselves. In both cases they operate at high speeds. When one passes from awareness to consciousness, a mid-range tempo appears, probably because more complex forms of data management are involved. This transforms rapid experiences into themes that can exit and enter awareness at various speeds.

Using different words and notions, other authors have developed the same theme. Beatrice Beebe (et al, 2005) has shown that this is not only true in verbal communication but also in bodily communication. When she explicitly reacts at a mid-range speed with either depressed or over-excited children, they often find more reassuring ways of regulating themselves during an interaction. In other words, by creating forms of common, shared awareness in therapy sessions, the setting can help individual awareness systems to find new forms of nonconscious regulation, and to strengthen their necessary illusions in relevant ways. A similar way of working is described by Maarten Aalberse (2001), when he discusses the use of "felt gestures" in psychotherapy.

Beebe also recommends that one distinguish self-regulation and interpersonal regulation clearly, while acknowledging that they are both part of the same system. When one talks with a problematic parent, being able to autoregulate comfortably creates different communication systems than being incapable of regulating oneself.

Edward Tronick (2005) distinguishes *individual states of consciousness* from *dyadic states of consciousness*. He then shows how the construction of dyadic consciousness can help the persons involved to modify their ways of thinking, to form richer forms of awareness which will then support modifications of communication strategies. These modifications can have

catastrophic implications when infants are raised by intrusive or depressive mothers, (which can however be modified in a therapeutic context).

George Downing (2005) has established therapeutic methods using video analysis to refine how consciousness, awareness, and nonconscious process can be integrated by both therapists and patients.

Since I have differentiated awareness and consciousness in this way, I have also paid more attention to distinguishing what patients are aware of and what they share. Working on the construction of shared awareness is an essential dimension of the construction of love. During my sessions, I am creating shared images (e.g., when analyzing a dream), a common sense of how a patient experiences his body, and how he experiences me. It is by developing this shared mythology with a patient that I try to help him to transform his conscious and nonconscious way of self-regulating, of communicating, and of sharing.

I hope I have shown that consciousness cannot deal with all the information that resides in the organism from all points of view. It can only manage information that is edited in such a way that it becomes manageable for awareness devices. Because of these mental system constraints, illusions, repressed information and secrets are necessary ingredients of mental dynamics. However, because the mind is complex and heterogeneous, the coordination of its elements is necessarily messy, which explains why the choices made by editing systems can sometimes be destructive. The organism has contradictory aims. For example, when I meet patients who suffered from abuse during their childhood, I warn them that a) they cannot not love their parents, and b) they must detach themselves from their parents to protect themselves. This task is, of course, impossible to achieve without a certain amount of self-destruction, because repression systems never work so well that you can edit the past out without creating distortions in the mind.

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¹⁵ "Communication: the interface between in and out the body" (this translation has been approved by Rubens Kignel).

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Biography

Michael Coster Heller, Ph.D., psychologist and psychotherapist is recognized by the Swiss Federation for Psychologists. He was founding editor of the *Journal Adire*, of the French speaking Association of Biodynamic Psychology, and edited a volume based on the 1999 congress of the European Association of Body Psychotherapy (EABP), entitled *The Flesh of the Soul*. In the EABP he was chairman of the Ethical and Scientific committees, member of the Board, and vice-president. He practices in Lausanne (Switzerland)

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