

## **IMPLICIT MEMORY. INTERCONNECTIONS BETWEEN NEUROSCIENCES AND SUBJECTUAL GROUP ANALYSIS**

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**Abstract:** In this work we will talk about implicit memory, a function of mind which contains and represents the first traces of environmental interaction and which follows us for all our life. We will talk about discoveries in neuroscientific field which contribute clarifying change's places and mechanisms. In proposing a satisfying explanation of implicit memory, and moreover its emotional implications, we will address the possible existing interconnections between neurosciences, starting from neuronal plasticity constructs and networks, and subjectual group analysis, explicating the mind-body-relation paradigm, with the purpose of integrating particular opinions to enrich a common vision.

**Keywords:** Implicit memory; relational mind; mind-body-relation

## 1.INTRODUCTION

The matter of relation between mind and brain has always been central in the study of subjective aspects related to psychic activity. During the time on this subject numerous theories have been elaborated, some of which recur in current discussions.

In the last decades in fact, neurosciences, that is the whole of subjects which have as specific object of study the nervous system, have created a net of connections between philosophical, psychological and biomedical sciences such to virtually configure itself as a network continuously in process capable of integrating data learned from various ambits of research and of opening to continuous connections and new possibilities of theories about study of mind. All this in the perspective of an integration of the knowledge one time coexisted as dualisms and today offers us a new perspective on the forming of human experience, insofar they are capable to confer scientific rigor to intuitions and hopes on the idea of care, or better on the idea of how relation and its quality can heal.

From the wide and complex field of neuroscientific discoveries we chose, for the correlation with subjectual analysis, to cross the path of memory, in particular, we will have as object of observation the implicit memory, the precious function which keeps the traces of our story and so of our individual and collective being.

### *Implicit memory*

Trying to make a synthesis of what implicit memory represents, in its sense of Self organizer, we could outline a series of focal points which would show how this cognitive function is extremely precious:

- It represents the first kind of registration of experience
- It is the only possible memory at birth and during the first 24 months of life, as it comes about in brain's subcortical structures which are already mature at that stage of development
- It is activated with environmental sensorial experience and doesn't go along with awareness of remembering

- It is still emotional or affective memory, in the sense that it is determined and determines the emotional quality of experience
- It is a mind function which walks along with us for all our life and it is plastic, capable of transformations.

Squire (1992), Schacter (1995) and LeDoux (1969) researches has shown us the qualities and places of implicit memory, in particular amygdala, the emotional center of our brain. Differently from superior cortical areas which illuminate in zones, amygdala is all, constantly, illuminated, with a major or minor intensity according to the major or minor emotional intensity of the experience. Impulses come from senses in a few milliseconds, a very short time for word, unlikely for a drug's action, sufficient for non verbal messages such as a look or the tone of a voice, the rhythm of a movement or a scent in the air. We are in the reign of pre-verbal and pre-symbolic, certainly of the non conscious.

It is in this space, in fact, that brain builds its mental patterns, that is the basic components of implicit memory. These patterns, result of the relation with the outside, help to found familiar objects and experiences, and to understand what we must expect from the environment around us.

*But which are the neurobiological modifications able to explain the mechanism of stimulating of an emotional memory?*

Any sound or image that can set off an emotional reaction, without the subject being conscious about it, is transferred to the implicit memory. This reaction implies neurofisiological modifications, such as variation in the heart beat or breathing rhythm, paleness, blush, sweating. These states are registered in the thalamus which is connected to amygdala in turn connected to Hypothalamus and so with endocrine and autonomic regulation. Therefore a certain event will be saved with its emotional coloring, taking a subjective value. The memory is stored, so that it can be evocated in whole by any detail but belonging to the memorized scene; for example a caress or a scent can take us to remember a pasted event of our life.

Generally events that are strongly characterized of an emotional valence are remembered with high sharpness, and this is possible because of the positive connection between the value of memory's vividness and the value of the emotional strength of the event in the moment it has happened (Oliverio, 2013).

This allows a variety of clinical reflections, one among many, for example, could be the possibility to use implicit memory as a rehabilitation instrument for treatment of patients with dementia.

Actually, in front of the various losses of mnemonic traces in patients with neurodegenerative diseases it could turn out to be effective stimulating memories, starting from the value and the emotional impact that they cover in the patient's life; they would represent, therefore, the main road or probably one of the few communicative strategies that is possible to experience with these subjects, especially in an advanced stage of disease, when the language as the other cognitive capabilities are severely compromised.

Actual researches on using massages with persons affected by dementia, have put in evidence the existence of only 18 studies on massage therapy and dementia and only 2 of which were considered suitable in their methodological rigour. The few amount of data available at the moment is in favour of massage and touch for want concerns the therapeutic efficacy in demential subjects with behavioral troubles, but the same data are too limited to allow general conclusions (Hansen, Jorgensen, Ortenblad, 2006).

The hypothesis of improving the condition of life of these patients through the awakening of emotions and non verbal contacts, essentially made of looks, caresses, scents, sounds, seems to be a kind of action which deserves to be more deepened .

### ***Implicit memory in therapeutic relation***

Siegel says that in the forming of a mind the social element comes before the individual one. In the model that holds up his study neurological and psychological knowledge are kept together: both neuron and dialog, both brain maps and the socializing function of smile and preverbal caresses. The mind, says in fact Siegel, "is the product of interactions between interpersonal experiences and brain's structures and functions".

The characteristics of implicit memory which we have explored immediately open connections with the basic assumptions of clinical work, in particular they give centrality to relational experience.

If the first memory traces of interaction tend to form the early pattern of orientation, and if these traces are plastic, that is transformable, we know

that the traces can be reached and transformed in the same way they were formed, that is with our being in the world, our way of being (Barnà, 2007). Therefore, implicit memory can change. In the implicit memory there are the earlier relational patterns, the unconscious representations that we bring in our relations. Here is the root of the transfert which alters our daily therapeutic and non therapeutic meetings (Allen, 2003).

Let's take for example a passage of Daniel Siegel's text "The relational mind" : «A thirty years old woman sits quiet at the therapist's. When he asks her for the second time "How did the visit to your mother go, the last week end?", she seems confused, she bites her lips, looks away and stare at the floor without saying anything. Then she covers her eyes with her arm and starts moving nervously her feet, while her breathing becomes quicker and quicker. Silence. At this point, the therapist realizes that his heart beat is accelerating, looks at the floor and notices that he is rhythmically tapping his feet against the floor too. His state of mind is showing with non verbal signs: the expression of his face, looks, movements. In a low voice, slowly says "I understand, it was a difficult week end" and in the meanwhile he feels his head is going to blow up. Suddenly the patient exclaims "Horrible!" The therapist immediately feels a sense of relief, his muscles relax, pressure in his head disappears. The woman seems less tense too: "Horrible" repeats moaning and starts crying. [...] Communicate does not only mean to understand or feel the signs - verbal and non verbal - that are passed by others; because between two individuals begins an full and effective emotional communication it is necessary that each of the involved person let his state of mind be influenced by the state of mind of the other.»

Therefore, in a therapeutic meeting many states of mind are activated; the contents and the ways of the talk, the rhythm and the cadence of the session, the safety created by the set(ting), the time, the room, they all activate all the levels of memory. They are elements that "arrive" to the explicit and conscious memory, but they arrive to the implicit memory too, maybe not immediately, it takes some kind of check (the therapist that smiles or has a benevolent look, the same room, that the time is not changed too often, that the therapist is honest in his honorarium) with all the other thousand of information that have to do with his "being there" for us (Weiss, 1993).

The states of consciousness that can be generated within the set(ting)are shared by both patient ad therapist: we can say today, more that yesterday, that relation cures.

In fact we can say that changes in the State of Ego consist in altering synapses chemical processes in the brain and this change importantly

depends on the nature of the affection implicated in relational processes (...) (Scilligo, 2005).

This consideration send us back to the work “La cura relazionale” (Lo Coco e Lo Verso, 2006), which proposes a reading of psychic pain as a “relational” phenomenon, not exclusively attributable to the functioning of the single person but as event which becomes significant in the net of relations in which the person is included. Such a reading of psychic pain implies by consequence the elaboration of methods and patterns of care which provides the numerous relation between persons as an instrument of transformation/change. The task of who treats, who is treated, is so to think about and put up therapeutic projects able to keep together the person’s significant relational nets.

It is basic to consider these concepts in an interpersonal dimension as it is exactly the interiorizing of the therapeutic relation and co-construction of new meaning which lead to change and cure.

As Liotti (2005) affirms, “if the therapist interacts with the patient so that an unconscious expectation of a repetition of the negative experience is disconfirmed, then will happen important improvements in the therapeutic relation”.

The Noble premium Eric. R. Kandel in his work affirms: “If changes led by psychotherapy keep in time, it would be reasonable to infer that psychotherapy leads to different structural modification in the brain, like it happens in other kinds of learning.

### ***The relation that cures: confronting theoretical prospects***

To face the “relational” matter , it is necessary to take a step backwards and shortly run through the more incisive and innovative discoveries, coming from neurosciences and from clinical dynamic psychology, which are of merit of connecting the neuronal development with the experience interweaved of human relations through which each person can realize evolutionarily himself.

The neurosciences, now by a long time, have proposed a plastic conception of brain, which follows that orientation known to the scientific world as neural Darwinism (Edelman, 1995, 2004, 2007). Specifically, it considers the brain as a plastic and opened to experiences organ, able to assume different structural and functional features connotations, according to genetic and experiential basis.

This constant plasticity is in various ways related to the radical relational essence of the mental which constantly builds structural matchings with the environment system (Napolitani, 1987), that is new combinations between things in the world, which generate an incessant psychic dynamism.

The man's identity is characterized from the outset for its 'culturalism', ie to the settlement, tanto più stabile tanto più precoce, of segments relational the environments which relate the individual who born in that environment and you go expressing; the individual identity consists of relationships internalized (identification) which together constitute a groupality internal (Napolitani, 1987)

In a neuronal prospection the corresponding to the relational human essence are mirror-neuron (Iacoboni, 2008), a specific type of neuron which is activated either when someone makes a determined action either when observes others making it. The recent discovery of mirror neurons gives us an explanation of the neurobiological mechanisms involved in empathy and in recognizing and sharing mental states of others and of their emotional resonance, showing how reciprocity that ties us to others is a natural human condition, pre-linguistic, pre conceptual and pre rational (Rizzolati & Sinigaglia, 2006).

Another field of absolute vanguard is the one that explores relations between epigenetics, behavior and mental health: particular emotional contexts, the lack of parental care, determine in the new born alterations in the methylation processes in hippocampus and in the hypothalamus-hypophysis axis modifying its genetic expression and attachment style.

LeDoux (2002, 2006) maintains that experiences leave their sign in the brain through our memory register, which is a product of the synap-tic activity present and operating in neuronal circuit.

In simple terms we can think that our organism is programmed to survive, reassuring idea if we think about the level of exposition to danger of which a creature becomes part at birth and in the first months of life. This creature "scannerizes" the environment, in neuroscientific terms "processes" sensorial stimulus that come from the outside, to verify the existence of a security condition and only after this operation activates other neural nets fixed to enjoy them same sensorial stimulus he has verified are not dangerous. This is, first life, then its quality.

In this logic, a child who has the luck to grow in a secure enough environment, will however tend to process sensorial stimulus before getting pleasure from them, but he won't go looking for danger; parallelly, a less lucky child will almost certainly expect to find danger.

We are at the neurobiological basis of the attachment style; we are in the forming of relational schemes, to the roots of existential positions, at the primary protocol of the script.

The concept of tuning (Stern, 1987), in a particular way, allows to start and explain how it is possible that in a child's mind develops the capacity to integrate, in a coherent way, the different instances – emotions, desires, memories, perceptions, fears – that huddle together in the same moment. Through the processes of emotional and of “ranging” of states of mind (Trevarthen, 1998) communication, the child answers to parents' neural activation patterns through the mechanism of “Interiorizing”, which allows the activity of adult's more mature brain to directly mould the development of his neuronal systems. The processes of emotional tuning create between parent's and child's mind connections which are essential in allowing the child's brain to acquire the capacity to modulate and organize its functions in a more and more autonomous way.

The adult supplies the child with schemes of organization of behavior which he will after interiorize and use inside his mind. In this sense, individual mind is, actually, an individualized social mind (Siegel, 1999). This elaboration creates direct connections with subjectual group analytic research (Lo Verso, Di Blasi, 2011).

In the new born seem in fact to exist some primitive and direct kind of affective sharing, which consist in automatic reactions to expressive stimulus showed in the other person.

The first to have identified the existence of innate abilities of emotion recognition, combined with an innate tendency to automatically respond to these in a congruent manner, was Charles Darwin (1872), holding that emotional expressions act as signals that communicate to those congeners a certain emotional state and are able to determine its expressive response for automatic imitation. Shooting from the modern ethologic, Darwinian positions have been treated in terms of emotional contagion, defined as the set of immediate and involuntary emotional experiences that lead us to respond to emotional expressions directly for automatic imitation.

According to Bonino, Lo Coco and Tani (1998), the tendency to answer immediately to others' emotions, seems to be the dominant characteristic of the affective processes in child's first months of life, based in fact on mechanisms of emotional tuning between mother and child which lead to a mutual affective mimicry.

Wallon (1967) in this sense has talks about automatic and precognitive answers of assimilation and introjections of other's emotional experience:

the emotional contagion is such an automatic experience of emotional sharing that the other's emotions become the own emotions, and who is infected, or who infects, lives the same emotions without difference between one's experience from the other's.

Talking about emotional contagion in terms of imitation of a behavior, has lead Trevarthen (1993) to individuate in the new born the capacity to decode the other's internal emotional states, catching directly his emotions, and to answer to them in an equally immediate and direct way. In this sense Trevarthen maintains the existence of an inborn, primary *intersubjectivity*, which allows to enter in a direct way to the others' mental state: the child that observes the mother's emotional expression, immediately imitates what perceived, tuning intersubjectively with her emotional experience.

For what we know today, tuning is the matrix of each therapeutic relationship. Today we know what they are the basics neurobiological, when we talk about intersubjectivity we speak the "alignment" of states minds (Trevarthen, 1993). A phenomenon so fascinating precisely because biological. The interaction between a child and the first attachment figure occurs through continuous phenomena of "alignment" of states of minds.

Everything is fairly summarized in the vision of a relationship that nourishes, cure or destroys, and also affects the body level, because the psychic life, as well as the biological life, relational processes arise from essentially psychosomatic.

Siegel, as previously discussed, uses the results of neurobiological research to show how the interactions with the environment and in particular how the relationships with others, have a direct influence on the development of structures and biological functions. The aim of his work is, after all, scientific research integrated of those that are bases interpersonal and neurobiological, of the development of mind.

Within this perspective, it seems appropriate to speak of a true theory of mind in fact defined as the ability of explanation and psychological understanding possessed by humans, which allows them to intuitively understand the emotions, actions and mental states of others through simple mental inferences.

### ***Relational minds and mental life of groups.***

The vision of the relational mind proposed by Siegel, meets with the hypothesis of the historical foundation of the psychic relational-that is the

theoric heart of the subjectual groupanalytic model (Lo Coco, Lo Verso, 2006; Lo Verso, 1989, 1994).

From a strictly neurobiological point of view, we made use of the theory of cerebral function to explain the original inter-subjectivity of the human mind, which is what the groupanalysis subjectual has called Transpersonal.

It is understood by Lo Verso (2008) as the set of relationships within a specific cultural device that the individual "incorporates", even dynamically, starting from birth, it is constitutive, on the side anthro-po-psyhic, from the psychic birth and then of personality. This processing is in favor of a non-reductionist epistemology and circular that allows you to not be shortsighted about the strong presence in the body of the mind and the relationship. It is possible to support with more rigorous epistemic interdisciplinary the centrality of the relational dimension, which is the scenario in which real and imaginary emotional life unfolds (Lo Coco, Lo Verso, 2006).

For the subjectual groupanalysis the concept of relation not only describes the interactions visible, social of the humans, but includes the invisible components of the unconscious psychic world of individuals and psychic fields existing relational among people and in the inner world of each (Lo Verso, 1994; Lo Verso, Di Blasi, 2011; Giorgi, Lo Verso, 2011).

In light of the said, it should talk about the mind-body-relation, because without relationship is not given neither mental nor physical development (Lo Verso, 1994; Giannone, Lo Verso, 1996; Di Blasi, Lo Verso, 2006).

The Clinical experience and psychotherapeutic, the contributions of the complexity theory (Morin and Pasqualini, 2006) and of the constructivist model, the evolution of neuroscience and clinical psychology (for example the infant observation, attachment theories, studies on the born of the family and transmission of the transpersonal psychic) with the heuristic possibilities that have opened, there have therefore led to propose a model mind-body that not homologous or not separates the three aspects of the problem mind-body-report, but rather sees them as three vertices of observation, each of which may, and sometimes must, be privileged with a conscious "as if" with respect to pose a summit before another (Giorgi, Lo Verso, 2011).

The importance attached in this work to the group context stems from the fact that in to subjectual groupanalysis, also from the methodological point of view, the very analysis focuses on the relationship Subject-Otherness-Body, so that the group is presented as a observatory privileged to capture contemporaneity of the facts mental-biological-relational.

In this regard, studies on the relational process in the field of experiential of the psychotherapeutic situation (Lo Verso, 1989) show that every psychic event is realistically experienced in the body and vice versa, even more radically this seems to be able to extend to every relational fact (Lo Verso, Lo Coco, 2006).

As already pointed out several times, under the thrust environmental, that is of experiences, is continually builds the brain: perceptual maps of the world would be subject to a continual recategorization, thanks to the action of memory and other functions. The psychic plasticity, meaning the ability of transformation during growth and development, is particularly evident in the group. The road to becoming ourselves splits into a large number of paths: if the connections established by our brain make us who we are the group can activate other connections, useful for the development and growth of our psychological self, social not only synaptic (Di Bella, 2006).

The set(ting) groupanalytic, own because fraught with looks, bodies and relationships, seems to be a privileged place to grasp the great unifying value of Otherness. It is within this therapeutic device that circulate phenomena such as empathy, attunement, intersubjectivity, that result in the need to read the intentions and feelings of others and the need to define, maintain or restore the one's sense of identity and cohesion. The group as a bearer and conservative than implicit memory namely the ability to trigger the emotional component that originated from the mind, expressed by the body, is manifests in the report and this is a process vital that mobilizes continuously the behavior of the subject.

In the group you do not look outside, but inside a multiple mirror that creates a space in which the internal and the outer, the individual and the group interpenetrate and you overthrow one in the other; is in the other individuals in the group that an subject sees himself, and is in the other individuals which is found to reconstruct his image refracted.

In summary, the mind is formed in the interaction between neurobiological processes and interpersonal relationships: are the relationships with others that favor or inhibit the organization of neural circuits, their ability to take action in response to stimuli that determine the way in which for lifelong we come into contact with the world and with ourselves, property that is the basis of implicit memory, in an epistemological framework that encompasses together, as if they were a single explanation of the phenomenon same, a point of view more properly organic, the relational mind, with a prospective more clinical-dynamic, the mental life of the group (Rugi, 1996).

## ***CONCLUSION***

In summary we can say that an increasingly important part of neuroscience believes that the brain is a plastic organ and open to experience, able to take on different meanings structural and functional, depending on the genetic and experiential bases that characterize the individual. This conception of plasticity (and to some extent also dynamic and experiential) of the brain is of central importance for us because it creates possible alignments and compatibility with the results of the clinical-psychological research.

The mind in substance should not be understood in terms of structure, but as a dynamic process that emerges from the activity of the brain, whose functions are directly influenced by interpersonal experiences (Siegel, 1999). In particular, the mind develops from processes that regulate flows of energy and information within the brain and between different brains (Siegel, 1999). The concept of the mind as an entity, therefore, needs to be reviewed. The mind is not a thing or an object located in the body or in space but a rope used to circumscribe many psychological processes, mental phenomena and personal experiences different, although often connected.

Therefore, the contribution of neuroscience enriches the perspective on the formation of human experience, on the neurobiological basis of attachment style, on the origin of relational schemas, knowledge which are of a high explanatory power the psychotherapeutic dynamic and they give centrality of relational experience.

Moreover, the groupanalysis has placed at the center of his observation the subject or rather the interplay of relational phenomena, understood as living presences, inside and outside the subject and his familiar world. In this perspective, the groupanalysis is to be understood not only as practice analytic applied to groups but also as a new epistemological perspective that studies the mind in the sense multipersonal and not just individual. A theory of mind conceived how to plot of pre-concepts conscious and unconscious, beliefs affective-emotional and schemes behavioral that the individual internalizes in the relational bathrooms of all his experiences groupal: transgenerational and family, social and cultural. There is an obvious reference to the concept of matrix, the network internalized and interactive relationships through which individuals create deep links and permanent. This network, as well as states Foulkes (1964), "is the matrix of mental life." The identity, in that sense, is structured and evolves in relational networks to which the subject belongs. So, to speak of Transpersonal mean to refer to

the network of relations unconscious in which it is sedimented all of the biological and cultural heritage of the human species and through which the human psyche is based (Giannone, 1996).

The groupanalytic theoretic model and the current psychodynamic orientation research, therefore, can be integrated with the most innovative achievements in the neuroscience of the relational experience

In light of the above, there are many margins of comparability between epistemology clinical-psychological and science neuro-biological, and this has initiated a paradigm shift that has taken the form of a device disciplinary hybridization fundamental to the understanding of connections between processes relational and processes bodily.

Seems that was done a step in the direction of integration, there is more optimism about the possibility of a relationship between neuro-biological research and psychotherapy. This is due to the fact, already repeatedly stressed that the new clinical and epistemological settings neuroscience seem to allow theoretical connections and operating through the visualization of biological systems as facts that interact with the experience.

In addition, there is the increasing awareness on the part of clinical psychology-dynamic, that the report is a fact that can't be separated from the presence of the body, because it is here that human relationships you incorporate and incarnate and vice versa (Giannone, Lo Verso, 1996).

The experience contaminates biology; the psychic subject is an inextricable intertwining of biology and history. As in the early stages of development, are taking shape, precisely because of the experience gained, the neural pathways, incomplete at birth, so nature and culture operate in a similar way: they are simply two different ways to make deposits synapses of the brain (LeDoux, 2002). A man "radically organic" is "radically cultural" at the same time (Gehlen, 1983).

The goal of this work, ultimately, we hope will be to establish a connection between two different experiences, that neuroscientific and that groupanalytic. The hope is that this may help to put in the right perspective, and systematize conceptually the complexity, resulting in an attempt to hold together the steps "brain-body-mind-culture" of the psychodynamic and groupdynamic phenomena. Moreover, we repeat again, we do not believe that there are individual disciplines or scholars able to deal with a framework so wide.

That said, it is evident that the study of implicit memory represents the neurobiological foundation that connects a variety of theories, attachment theory, the work of Daniel Stern, the motivational systems (Lichtenberg),

internal working models (Bowlby), the cognitivism evolutionary (John Liotti), the control-mastery theory (Weiss and Sampson), the mind-body-relation model. These theories, though tending to the complexity, should proceed in favor of an integration in order to ensure internal consistency and a constant dialogue.

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