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## **GREGORY AND NORA BATESON'S THINKING AND THE RELATIONSHIP WITH NEUROCOGNITIVE REHABILITATION**

I met Nora Bateson for the first time during a congress organized by our Neurocognitive Study Center in Santorso (Italy) in 2010. We had invited her because many of her father's Gregory principles had become part of our rehabilitation theory: and now they also were embodied in the real practice of exercise and in the devices we use in the rehabilitation of patients with brain and traumatic lesions or very severe chronic pain too. By the introduction and application of Gregory's theories to neuro-cognitive exercises we immediately have had an improvement in the quality of recovery of functions.

During the congress, we told Nora how the neuro-cognitive rehabilitation had taken in account and used her father's thinking in our therapeutic practice. In that occasion, Nora asked us to see some therapy sessions. Early in the morning she came to our rehabilitative station and watched us working with the patients. Immediately it became clear that our exercises, which usually are difficult to interpret for non-experts, were well understandable for her. The epistemology she had 'breathed' as a child with her father, and later cultivated with her studies, allowed her to understand the meaning of the learning process underlying our exercises. She was excited seeing by her own eyes the practical application of her father's basic concepts: information difference, relationship, context, knowledge, complexity, system...

After that meeting, with her typical enthusiasm, she promised us to come back and stay with us longer, to further study and to design a collaboration with our Neuro-cognitive Rehabilitation Centre. She kept her promise. She returned for one week, and stayed with us and our patients every day. At the end, she took her role of filmmaker, shooting a film about our work, so that other scholars could see it. The year after she came back again with 12 scholars from different scientific fields and different countries. They wanted to watch, and to try on themselves, our tools and practice. They were willing

to understand how a damaged system, impaired by lesions, through knowing processes could change, remodeling its brain cells, its connections between body and mind, its bodily segments, and so recover lost functions. Usually in science, today, such recovery is considered impossible, the prevalent opinion being that the lost functions can just be replaced by mechanical robotic systems, or relocating them in the healthy side of the body.

What in Gregory Bateson's thinking did allow us to bring about a real change in the patient's behavior, inducing the plastic biological processes on which the recovery is based?

The concept of "knowledge": it is knowledge that changes the biological structure of the brain. What organizes movement is the intent to interact with the world: to know it, to give it a meaning related with the intentions of the subject, his history, his experiences, in that moment, that specific situation, that specific context.

The concepts of "information" and "difference". Gregory says: "information is a physical difference that turns into a cognitive difference". Cognitive processes are important to build information. It is the difference that activates the different parts of our mind. In any learning situation of our life we always can find out differences: inside the situations, the objects, the relationships, the context. We always are comparing our present and previous experiences, what we already know with present situations. Differences activate many different part of the mind in relationship with the new situation. This allows us to learn. So, we are in a permanent process of learning. While looking for similarity, we find the differences, and these differences expand our knowledge and our possibility to have more complex experiences.

The concept "Learning to learn". Rehabilitation is a learning process: both in learning and in recovery the same biological changing mechanisms are involved in our brain. Learning processes produce new synaptic connections in the brain and generate new cerebral cells too. This is the basis of recovery and of the possibility to improve our ability to interact and to understand different contexts. Only learning processes can modify the biological structures of our brain. To do that, the patient must activate cognitive processes: attention, memory, perception, vision, representation, comparison, problem solving etc.

Bateson's concept of "Multiple descriptions" enables us to go a little closer to the true, deeper, essence of pathologic events. One key description, beside the technical ones, is the patient's personal experience: patient's words as the metaphors he uses are the most important mean to understand the complexity

of the patient and of his pathology, and the main way to help him to recover. It is only through his language that we can understand the complexity of this human system, his subjectivity: what he feels and what emotionally feels in his body, in its parts in relationship with the world. We can empathize with him, and so enter a wider possibility to do the best for him.

We also shared with Nora the concept of a “nonlinear circular cybernetic vision of the human system”. For example, in a pathological condition, each lesion of any part of the body also entails changes in other parts. And it is difficult to determine where the process began, and where and how the other parts are consequently stuck.

In our Italian meeting with Nora we discussed a lot about the “pattern that connects”. Gregory Bateson gave us an idea of mind as an interactive, self-correcting, evolving process, she clarified. He proposes an ecological vision, in which the different elements from different part of the brain contribute to these processes by links of relationship and mutual exchanges. He criticized the objectivist vision of mind as a fixed and unchanging brain, receiving information from the outside. In any case, he believed, information is constructed: “information” is such only as an intentional interaction of the subject with his environment, aimed to satisfy a need of knowledge of his brain.

The importance of the “context”. Without context, words and actions don't have any meaning. For this reason, the rehabilitation exercises always must be introduced in a theoretical context: the patient must be conscious that the experience of the single exercise is connected, by similarities and differences, to the actions that we (the patient and the rehabilitator together) want to recover; and that the exercise is connected to the correct, meaningful, emotional experience he had before the damage.

In Gregory Bateson idea, “Mind and Nature” are two great systems partly interacting and partly independent. One system is inside the individual, and we call it ‘learning’; the other one is immanent in the inheritance e in populations, and is called ‘evolution’. They operate at different logic levels, but they combine in the interconnection: the “pattern that connects”. Talking with Nora about this concept, very important in ecology, in epistemology, and for rehabilitation too, she explained us that in Gregory's thinking “pattern that connects” is meant as a textile, a weave of integration: it is dynamic, it holds together, but at the same time is ever moving. ‘Pattern’ because it is open, but at the same it has a form. Such concept of ‘pattern’ is useful in two different ways: firstly, because it generates empathy. I can see the moving forms in the

life of a tree, or in a friend, or in a city. By this kind of empathy I can observe things in many ways. The integration that I can see in a tree will not be the same I see in a friend. The pattern is specific. It can be easier for us to see and understand a dog as a living being, it is perhaps more difficult to see a city as a living system. The pattern can help us to have the empathy necessary to do crossings, to compare different systems (to cross references, as Nora said). You can be indulgent with your dog when it pops on the ground, but you would like to kill your colleague if he leaves your working room in a mess. You can understand your dog's behavior on the basis of its limits and of the complexity of its being a dog. If you empathize with your dog all this is possible, it is easy, and it can also be a key to get into your colleague's complexity. This is what I call cross references: it is a way of doing connections. This is the basis of the rehabilitation we practice with our patients: we teach them to connect their previous life, before the damage, the exercises, and the impaired action that we are now trying to modify to rehabilitate. That is what we call: "Comparison among actions" in Neurocognitive Rehabilitation.

Nora said: Gregory brought a crab in the classroom in the University and asked the students how they could say that it was a living being. He asked: 'How can you know? Describe the 'pattern that connects' that you see, in which forms do you feel that this is a living being?'. You know that it is a living being, but being able of describing such forms is a higher kind of knowledge.

I said, this idea of pattern is helpful as a form of empathy that we could see in action, for example in Manuel, a young patient with a brain damage, hospitalized in the Center. He had made an exercise in which, closed eyes, he had had to recognize different objects, using his impaired hand, on the basis of their different lengths, with the help of the Therapist. He knew that this would have been helpful to learn to move his hand again, to take a glass, etc. After the exercise, while trying to take a cup with his impaired right hand, he watched his left hand, and tried to simulate the action with it. He was studying how to transfer his understanding of the left hand to his right impaired hand. This is cognitive process, but also a form of empathy: taking the feeling and the complexity of the left hand and instilling it in the other hand. We then asked Manuel to describe what he felt was common in the exercise and in the action of taking a glass. So we asked him to look for similarities and differences, and to describe them. Such a description involves and develops a higher level of cognition, of perception of integration, that it is the basis for recovery. Besides, this kind of integration of perceptions allows the patients

to see also other things of their life, and around them, in a different way. The patients often say that neurocognitive rehabilitation have changed them: both inside themselves and in the way they see the life, their family, the relationship with other people, the world, in a better, deeper way then before the lesion! Nora was able to see all this in our work: “In your work you involve a lot of memory, imagination, physicality, attention, emotions and cognition, in every tiny movement. It is interesting that the patients can see such integration also in other forms.

Nora said: “The second reason why the ‘pattern that connects’ is helpful is that it has a form, but not a closed one: the form is open. The pattern is dynamic, always changing, it is in a learning process. Such openness of the process is aimed to keep the form in balance. These learning and changing processes occur relating with other human beings, in a context. The context too is in a learning process. Manuel is learning by the exercise, also thanks to the words his rehabilitator says, and to what his healthy hand makes; but watching them at work, I too am learning through the processes he is experiencing, and he knows it, he is conscious that I am learning from him. This is meta-cognition. He is conscious of his learning and of the possibility to learn how to take the glass, and much more. What Manuel, his therapist, and I (Nora) can learn is the confidence/trust that the system can learn. This process is learning to learn”.