My cat Phineas is lying on my bed facing me. He begins to yawn and I imitate him. He closes his eyes halfway and I close mine halfway. He notices this and opens his eyes, looking at me intently, and I do the same. He stretches his paw towards me, and I stretch out my arm towards him. We can play this mirror game for 10-15 minutes. During this game I feel an intimacy, a closeness and a connection between us that feels deeper than when we just play a game of chase.

Marco Iacoboni is one of the Italian brain researchers involved in the growing body of evidence regarding mirror neurons and their function. His book, “Mirroring People: The New Science of How We connect With Others”, reviews the neuroscience and psychological research exploring imitation, relating and the role of mirror neurons.

**Imitation**

Tanya Chartrand and John Bargh are two psychologists who wanted to answer a question: “Is the ability to imitate others related to the ability to emphasize, to feel what another person is feeling?” They set up an experiment. Two test subjects were shown a series of photographs. They each were asked to take turns describing to the other person what they saw. However, one of the test subjects was really one of the researchers pretending to be a test subject. While the two individuals were looking at the photos and sharing their impressions, the researcher was subtly imitating the spontaneous postures, movements and mannerisms of the subject. In other trials, the researcher kept a neutral posture, and did not imitate the test subject. At the end of the trials the test subjects completed a questionnaire to report how much they like the other participant and how smoothly they thought the interaction had gone. The subjects who were imitated by the researcher liked that researcher much more than the subjects who were not imitated. The imitated subjects also rated the smoothness of the interaction higher than the subjects who were not imitated (Iacoboni, 2008).

In another experiment, Chartrand and Bargh tested their hypothesis that the more you are a “chameleon” (the more you naturally and automatically imitate the movements and gestures of other people) the more empathetic a person you are. In this experiment, once again, one of the researchers pretended to be a test subject. This time it was the researcher who was either shaking his foot or rubbing his face. The actions of the subjects...
were video taped and their behavior was measured. Many of these subjects unconsciously imitated the face rubbing or foot shaking of the researcher. The subjects were then asked to fill out a questionnaire measuring their how empathetic they are. The researchers found a strong correlation between the capacity of these subjects to emphasize with others and the degree of the imitative behavior displayed (Iacoboni, 2008).

Recent neurological research helps to explain why. Paula Niedenthal, an American psychologist working in France, asked this question: “Does our ability to imitate the facial expressions of others affect our ability to recognize facial expressions?” Or as I would restate it: “Does our ability to imitate the facial expressions of others affect our ability to recognize subtle emotional cues?”

In this ingenious experiment two groups of test subjects were asked to detect changes in the facial expressions of other people. One of the groups however, was asked to hold a pencil between their teeth. The researcher found this “pencil holding group” was much less efficient in detecting facial expressions then the group not holding the pencil between their teeth. To understand why this is so, we need to understand mirror neurons (Iacoboni, 2008).

**Mirror Neurons**

In my previous article, “Mirror Neurons and Autism,” I wrote of the discovery of, neurons in or brains called, “mirror neurons,” and how these neurons are the brains’ internal mirror for what is happening in the world outside of our body. They were discovered during brain research on grasping actions. The researches had electrodes implanted in the brain areas of monkeys that are involved in planning and carrying out movement (Blakeslee, 2007). These mirror neurons not only fired when the monkey grasped a peanut, thy also fired when they observed another monkey or one of the researchers grasp a peanut! What mirror neurons do is to simulate in the motor areas of our brains (the areas that plan and execute motor actions), the action that is observed. In other words, I see my friend grasp a glass. The mirror neurons in my motor area are firing, just as if I were grasping a glass, except that my hand is empty. As far as my mirror neurons are concerned, there is no difference, in that moment in time, between my friend grasping the glass, or my mirror neurons simulating in my brain, my hand grasping the glass.
Let’s go back to the “pencil holding group.” To hold a pencil between your teeth, your motor neurons in your brain have to be continuously firing. If they stop firing, the pencil will fall out of your mouth. As we have already established, mirror neurons fire both when you perform an action and when you observe action. So the “pencil holding group” had enough mirror neurons busy with holding the pencil, they could not be available to provide a full simulation of the facial expressions being observed. Without a full simulation, the brain literally has less information and cannot recognize facial expressions as well as the group who had full use of their mirror neurons.

The existence of mirror neurons postulates the idea that imitation precedes and enables us to recognize the emotion behind the facial expression. As we have seen mirror neurons provide an automatic simulation of the facial expressions of other people. How does this lead to the emotions we feel behind the facial expressions?

The mirror neuron system has connections to the emotional center of our brain, called the limbic system. Mr. Iacoboni (2008) writes, ”The neural activity in the limbic system triggered by these signals from mirror neurons allows us to feel the emotion associated with the observed facial expressions—the happiness associated with a smile, the sadness associated with a frown. Only after we feel these emotions internally are we able to explicitly recognize them“.

In my own practice, when I mirror an autistic child, I try to make sure I am directly in front of them (whether I am 5 feet away or 1 foot away) so that I am capturing the child’s movements as if he were standing in front of a mirror. I become his mirror. If he moves his right hand, I move my left hand, because his right hand and my left hand are sharing the same area of space. I notice after awhile, perhaps within the same 30-minute session, or perhaps over the course of many 30-minute treatment sessions, as I mirror him this way, I am able to move closer and closer physically to the child. As the child lets me move close and closer to him, I feel a deeper and deeper intimacy develop between us. Indeed, Mr. Iacoboni (2008) believes one of the primary capacities of imitation is to facilitate and embodied intimacy between two people, parent and child, and between autistic child and adult.
**Peripersonal Space**

Peripersonal space is defined as a bubble of space around a person’s body that his brain includes as part of that person. It was first explored 30 years ago by an Italian neurologist, Edoardo Bisiach. (Blakeslee, 2007) More recently, in experiments by Princeton University Neuroscientists Michael Graziano and Charles Gross, they inserted electrodes into monkeys’ premotor cortex (an area of the brain that helps plan motor actions, i.e. actions for movement). They were curious about nerve cells that responded to both vision and touch. This in itself is highly unusual because the premotor cortex is traditionally associated only with motor action, i.e., movement. When they touched a monkey, perhaps on the back of his hand, one or more of these cells in this area would fire. Even more surprising, they found if they moved an object to within eight inches of the spot they just touched, the same nerve cells would also fire. In other words, besides touch, these cells were mapping a bubble of space around the monkey’s hand. When the object moved closer to the monkey’s hand, the nerve cells would fire faster, when the object moved away from the monkey’s hand the nerve cells fired slower (Blakeslee, 2007).

The researchers explain these nerve cells focus your attention on the body part being approached. They act as little sentries in your brain keeping a lookout for anything coming towards your body. These nerve cells not only alert your brain to the incoming object, they start making a plan, "Get out of the way!" or “You’re safe, you can keep your hand right where it is,” or “Grab that thing!!” The researchers have even discovered that these nerve cells can induce physical sensation before you are actually touched (Blakeslee, 2007).

Peripersonal space extends as far as a person’s arms extend, but around the whole body. (Blakeslee, 2007) My own arms approximately two-feet from my body. I am a short person (five feet tall) with relatively short arms. Thus, the average adult has a perispersonal space from approximately 2-4 feet. Thus, once an average adult is within two to four feet of another adult, they are most probably sharing their peripersonal space. We’ve all had experiences like these, having a conversation with someone who is standing too close to you, and you unconsciously (or consciously) take a step back, or the feeling of too many people in one elevator, even if no one is in physical contact with your body. Or, conversely, wanting to be closer to another person and merging your peripersonal space mutually with another person. As these researchers have discovered, we can even feel
physical sensations during all of these examples of sharing peripersonal space, although bodies are not being touched.

So what is happening with out autistic children? Are their peripersonal spaces highly reactive? Is that why it is difficult for us at times to get physically close to them? As I discussed earlier, as I mirror an autistic child, slowly but surely, I am able to move closer to them physically. Does mirroring create a sense of intimacy, as Mr. Iacoboni (2008) believes, and does that intimacy help to desensitize an autistic child’s peripersonal space? My experience with autistic children and the mirroring work I do with them lead me to say, “Yes,” for this is my experience as I mirror autistic children. I am able to physically get closer to them, and at the same time I can feel a deeper emotional bond being forged.

If you want to create a deeper emotional bond with an autistic child, act as their mirror. Imitate them, or as I call it, mirror them. You will not only help them make sense out of the world as I discussed in my previous article, “Mirror Neurons and Autism,” you will forge a deeply intimate emotional bond.

References

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