CODA

BEYOND BRAIN AND BODY

A Dialogue with Vittorio Gallese

Vittorio Gallese and Nidesh Lawtoo

> I think that a dialogue between cognitive neuroscience and philosophy is not only desirable but necessary.
>
> —Vittorio Gallese, "The Two Sides of Mimesis"

The genealogical orientation of mimetic studies led us to repeatedly look back to the ancient philosophical realization that humans are imitative animals to account for the protean transformations of homo mimetics in the present and future. This entailed, among other things, operating a paradigm shift of emphasis in contemporary discussions of mimesis that can no longer be restricted to realism but benefit from recognizing the imitative foundations of embodied subjectivity. The genealogy of mimesis we have traced in the first two volumes of *Homo Mimeticus* is of ancient origins; it finds in modernist philosophical physicians powerful advocates of the laws of imitation that flow contagiously between self to others, stretching across the body politic. The untimeliness of a long genealogy in mimetic studies is now confirmed by the fact that the mimetic turn found in contemporary neuroscience a timely empirical supplement to promote multiple *re*-turns to homo mimeticus that cut across the brain/body divide.

As is by now well-known, in the early 1990s a team of neuroscientists led by Giacomo Rizzolatti working at the University of Parma made an astonishing discovery. Like many important discoveries, it was accidental, unintentional, and thus unforeseen; yet it will turn out to have a major impact that will go well beyond the neurosciences, informing and transforming the human sciences

as well—if only because it both confirms and deepens our understanding of humans' all too mimetic behavior. The discovery itself didn't directly concern *Homo sapiens* at first but, rather, our close primate cousins, macaque monkeys in particular. Electrodes were in fact implanted in the premotor cortex area of the macaque's brain to measure motor actions, or movements. What surprised the Parma team was that an activation occurred not only when there was direct movement but also at the sight of movement, as the macaque saw the experimenter move the arm to reach for an object, for instance. Whether that object was a banana, an Italian *cornetto,* a peanut, or a gelato, is not essential and might belong to the register of myth—as Newton's famous apple.

Crucial for the humanities was the hypothesis that if motor neurons activate at the mere sight of movements in monkeys, evolutionary theory would suggest that these neurons should be present in humans as well. This is, indeed, what later experiments with single-neurons recordings in epileptic patients confirmed, leading to the discovery of a mirror neuron system (MNS) in humans. Why is this discovery important for the humanities in general and mimetic studies in particular? Because if neurons in the human brain activate not only at the sight of movements but also of facial expressions and images thereof, then, the ideal of an autonomous, fully rational, and solipsistic subject central to a dominant (read idealist) philosophical tradition reveals itself to be a myth. If we look in the empirical mirror, what appears instead is what mimetic studies has been arguing all along: namely, that *Homo sapiens* is also a homo mimeticus that is embodied, intersubjectively attuned to the mind of others since birth (actually, even prior to it), and open to unconscious forms of affective mimesis with the potential to give us a more or less direct intuitive access to what others may feel and think.

Skeptics might be tempted to retort: What now? Are complex human processes such as imitation, empathy, sympathy, and even something as complex as understanding the minds of others the simple product of neurons activated at the sight of gestures and facial expressions? How can something as concrete as physiological movements be linked to something as abstract as mental thoughts? And are empathy and understanding the only functions of mirror neurons anyway? What about the misunderstandings triggered by automatic mirroring reactions that, especially in a crowd but not only, can lead to antipathy, resentment, and violence?

These are valid objections that raise the double phantom of reductionism and scientific optimism. It is thus crucial to immediately qualify at least three points: first, neuroscientists are often the first to stress that "neurons are not epistemic agents" (Gallese 2011, 92) and thus emphasize that intersubjective phenomena cannot be "reduced" (92) to electric discharges in the brain; second,

there is still debate about the specific role the MNS plays in theory of mind, imitation, and empathy (Hickok 2014); third, "situational" and cultural approaches attentive to experiential differences (in terms of gender, race, sexuality, life-experience and other categories) are needed to supplement the neurosciences (Pitts-Taylor 2013). Last but not least, a long genealogy in the humanities warns us that mimetic processes do not only generate rational understanding and empathy based on patho-*logies* but also irrational misunderstandings and violence generative of cultural pathologies. And yet, precisely for these and other reasons productive dialogues across nature/culture binaries are urgently called for—a transdisciplinary move that is all the more relevant as it is part of the entangled genealogies of mirror neuron theory and mimetic studies.

Before launching into such a dialogue with one of the originary members of the Parma team, and one of the most outspoken advocates of the centrality of mirror neurons for aesthetic, cultural and philosophical debates, let me briefly consider both sides. On the side of the neurosciences, it is worth recalling that Rizzolatti and Sinigaglia open *Mirrors in the Brain* (2008) with an affirmation by the theater and film director Peter Brook who claimed that "the neurosciences had finally started to understand what was common knowledge in the theater" (2008, 1). Early on, then, neuroscientists encouraged scholars to situate the discovery of mirror neurons in a broader genealogy in the humanities that finds in performance, and thus mimesis (from *mîmos*, actor or performance), a privileged starting point. Conversely, on the mirroring side of mimetic studies, a genealogy of thinkers has long been sensitive to the mirroring properties of the human mind, if not brain. As we have seen in both volumes of *Homo Mimeticus*, already Plato had expressed the fear that actors' impersonating a role via mimetic "speech or bodily bearing" (1963, 393c) would spread a contagious pathos from the stage to the audience spell-bound by those mirroring gestures. Closer to us, but still a century before the discovery of mirror neurons, Friedrich Nietzsche put forward the diagnostic that there is an "ancient association between movement and speech" (1982, 142:89). And, a few years later, Gabriel Tarde argued that "there is in the nervous system an innate tendency to imitation" (2001, 148; my trans.), among other precursors I discussed elsewhere.[1]

Notice that these advocates of an unconscious that has embodied mimesis more than dreams as a via regia are emphatically non-reductionist thinkers; and yet, their theory of imitation suggests that a dialogue cutting across old-fashioned "two cultures" divides should emerge naturally between exploratory advocates of both traditions. We could even go further and say that if our genealogy of *homo mimeticus* is correct, then the discovery of mirror neurons would provide

an empirical confirmation, re-discovery, and extension of a long tradition in mimetic studies that was marginalized for a long time but is now *re*-turning to the forefront of the theoretical scene.

It is thus with great pleasure that we conclude *Homo Mimeticus II* by engaging in a dialogue with Vittorio Gallese.[2] Part of the original Parma team led by Rizzolatti, Gallese not only contributed to the (re)discovery that humans are imitative animals; he is also a philosophically-oriented thinker, or, to inverse a Nietzschean appellation, a physician-philosopher with a refined artistic sensibility. A strong ally for the mimetic turn, Gallese will help us articulate the theoretical implications of what he calls "embodied simulation" relevant for imitation, but also empathy, theory of mind, aesthetics, cinema and emerging hypermimetic subjects in the digital age as well.

I. Genealogical Connections: Mirror Neurons Now and Then

Nidesh Lawtoo (NL): In many ways, the discovery of mirror neurons lends empirical support to the hypothesis of homo mimeticus: namely, that humans are not autonomous creatures but are relational, embodied creatures wired to respond to the emotions of others, for good and ill. When mirror neurons were first discovered they generated a lot of debate within and beyond the neurosciences. For an idealist tradition in the humanities, they challenged a certain idea of what *Homo sapiens* should be: solipsistic, fully autonomous, rational, and disembodied. Debates are still ongoing concerning the specific role the MNS actually plays in complex emotions like empathy or sympathy. Thirty years later, what can you say that is neurologically certain about mirror neurons and what more has been learned since?

Vittorio Gallese (VG): First of all, we can say a lot more about mirror neurons in living animals at large. Our discovery was based on recordings of mirror neurons in macaque monkeys; it happened in 1991 with the first paper appearing in 1992. In the last thirty years, this neurophysiological mechanism has been revealed in singing birds, rodents, mice and rats, bats, marmosets, and even at the subcortical location: a very recent paper by our colleagues at Stanford University shows evidence of mirroring mechanism in the hypothalamus, dealing with

aggressive behavior. So, the very same neurons that are active during the expression of antagonistic behavior also fire when the animals witness the aggressive behavior displayed by another animal. Evolutionary speaking, it is thus most likely a very old mechanism. Nevertheless, it subserves different adaptive roles in different species that have different lifestyles and have been adapting into different ecological niches.

That said, the most exciting part of the story, at least for me and I suppose for you too, consists in the fact that we as humans have mirror neurons as well. Since the original discovery and very early on there was a strong surge for empirical evidence in favor of a similar mechanism in humans. The first empirical evidence came from a transcranial magnetic stimulation (TMS) study, performed in Parma; the leading scientist was Luciano Fadiga. It showed that there is a motor facilitation in the corticospinal pathway when you observe someone performing a movement. So, you have an increase of the motor-evoked potential if you stimulate the motor cortex while participants are looking at someone grasping an object with a hand. Then there was brain imaging evidence that demonstrated that the very same somatotopic arrangement that controls the execution of different body movements can also be activated by the observation of similar body movements performed by someone else.

Around 2000, together with the American philosopher Alvin Goldman, we then went out on a limb so to speak: we speculated that the same logic in the human brain perhaps could be uncovered also in the domain of sensation and emotions.[3] A few years later our group was the first to empirically demonstrate that this hypothesis was correct. The first evidence came from an experiment on physical disgust where we showed that the anterior insula can be activated both by the subjective experience of physical disgust but also when witnessing the facial expression of disgust displayed by another human being. One year later came the evidence about visuotactile mirroring: the second somatosensory area is a part of the cortical network that maps our tactile experiences distributed in different parts of the body that can also be driven by the observation of the tactile experience on the body of someone else.

That was the major trigger for me to part from the traditional simulation theory as put forward by Goldman, which I thought was too cognitive and dependent on introspection, on putting yourself voluntarily into the mental shoes of someone else.[4] Instead, I proposed the idea of *embodied simulation*, which constitutes an attempt to provide a unitary theoretical framework for a variety of phenomena.[5] Some deal with social cognition: empathy, intersubjective relation, mapping the actual motion sensation of others. Yet, it is not confined to the

social domain because it also applies to our relation to manipulable objects or to the way our brain-body maps space. Embodied simulation is thus a more general account of perception and imagination.

NL: Starting from the discovery of mirror neurons, then, the ramifications stretch well into problems central to the human sciences as well. To further the bridge between mirror neuron theory and mimetic studies, can you specify how embodied simulation helps us account for mirroring phenomena that operate not at the subpersonal but at the personal and interpersonal level? I am thinking of course of imitation, but also empathy and sympathy.

VG: I think that our discovery of mirror neurons was instrumental in creating, or at the very least greatly boosting, a particular aspect of cognitive neuroscience, which we now designate as social neuroscience: namely, the idea that we should map the brain and the body of individuals particularly when they relate to others. Embodied simulation provides a very parsimonious functional mechanism that shows how all these different aspects that characterize our social cognition rely on a very limited neurophysiological toolkit: namely, the reuse of a variety of brain circuits that serve different purposes to guide our navigation in the world and make us experience our relation to the world while simultaneously enabling us to imitate others, to understand others, to empathize with others.

You mentioned both empathy and sympathy. From an historical point of view, you can see why things got complicated because the Scottish enlightenment, specifically Adam Smith, in *The Theory of Moral Sentiments* (1759) spoke of empathy describing it as sympathy. In my account, empathy and sympathy are two different phenomena. I don't think you can be sympathetic without being emphatic, but you can be empathetic without necessarily being sympathetic. Being empathetic means to feel *with* the other; being sympathetic means to feel *for* the other. So, empathy has nothing to do with the Good Samaritan: that is, being naturally good, or showing the inbound proclivity to do good to others. I think that you can use empathy to manipulate others or commit evil acts. We should keep these two aspects of our sociality separate.

NL: Since you define empathy as a form of feeling with, which is the etymological meaning of *sym-pathos* that got lost in the wake of moralistic accounts of sympathy, maybe this already a good moment to go beyond good and evil and tell you why, as someone trained in the humanities, I got interest in mirror neurons in the first place. Two decades ago, I was working on a PhD on

the centrality of unconscious imitation in subject formation in modernist philosophical and literary authors. The thesis was titled *The Phantom of the Ego*, which is a phrase Nietzsche uses in *Daybreak* (1881). He does so to account for an affective permeability between self and others that is not moralistic but troubles the boundaries of individuation while also opening up a mimetic hypothesis on how we understand the feelings of others. In the same book, I was struck by the following diagnostic of what you call empathy and Nietzsche calls *Mitempfindung* in order to designate a shared pathos or *sym-pathos*:

> To understand another person, that is, to *imitate his feelings in ourselves*, we do indeed often go back to the *reason* for his feeling thus or thus and ask for example: *why* is he troubled?—so as then for the same reason to become troubled ourselves. (1982, 142:89)

This is the theory of mind that philosophers to this day have tended to privilege, the so-called "theory theory." But then Nietzsche opens up the following, more embodied perspective:

> it is much more usual to omit to do this [that is, consider the reasons of suffering] and instead to produce the feeling in ourselves after the *effects* it exerts and displays on the other person by imitating [*nachbilden*] with our own body the expression of his eyes, his voice, his walk, his bearing (or even their reflection in word, picture, music). Then a similar feeling arises in us in consequence of an ancient association between movement and sensation (142: 89).[6]

You told me after "The Mimetic Turn" conference that you were familiar with this quote. Could you now specify the ways in which this passage resonates with what you call "embodied simulation" and the "shared manifold of subjectivity" it entails?

VG: I was pointed to this quote in *Daybreak* by Nick Humphrey a long time ago. Since then, I kept quoting it because, on the one hand, it shows how poorly original we are. In a way, we keep reinventing the wheel. Although, at every turn of scientific or technological theoretical development you have a new perspective, a new angle. Through the discovery of mirror neurons, we can now back up this genial intuition of Nietzsche with empirical evidence. But the same applies to a variety of other intuitions that you can trace back throughout the history

of human thought and speculation about who we are and how we function in the world.

The recurrence of this intuition sometimes becomes obscured by subsequent theoretical developments. For example, this Nietzschean insight is coherent with the *Einfühlung* aesthetic that was blooming in the German speaking world at the end of the nineteenth century and in the early decades of the twentieth century. Thinkers like Robert Vischer, Heinrich Wölfflin, Theodor Lipps, Aby Warburg, and others became completely obscured in the first half of the twentieth century until today in many quarters of aesthetics and art history. Why? Because the body completely disappeared. Or rather, the body itself is turned into a text, while I would like to hold the opposite perspective: that any text is a body—and literally so. In fact, we embody words and sentences by means of mechanisms that are not very different from those that kick in when we relate with others through our body expression gestures, vocalization, and the like, which, in my view, is by the way where human language originated.

Being acquainted with this aspect of Nietzsche's thought and of similar views in a way reassured me about the theoretical validity of our empirical discovery. As a scientist you're always wondering whether the way you are interpreting your data is correct, whether your data can be replicated. In the background, there is always a lot of anxiety related to what you discovered and most importantly, what is the data supposed to mean: what can you do with those data? What is its heuristic power?

NL: Yes, interpretation is an art, as Nietzsche used to say; it also opens up competing perspectives and evaluations that sometimes, or rather often, generate disagreement. For instance, Gregory Hickok in *The Myth of Mirror Neurons* (2014) convokes the oldest trick in the philosophical handbook as he dismisses (at least in the title, the argument is more nuanced) mirror neurons—or the neurological mask of mimesis—as a "myth," appearance, or illusion. The rhetorical move is as old as Plato.

VG: Yes. In the opening you were mentioning the controversies revolving around our discovery of mirror neurons. In that respect, I like to quote a joke put forward by V. S. Ramachandran many years ago. Whenever you come up with something very new, the first reaction is: "it can't possibly be true." The second reaction after a few years is: "OK it's true but it doesn't explain anything." And finally, and we are not there yet: "Oh yes, it's true; it explains a lot, but we always knew it." [laughs]

In a sense, we are in the middle of the second phase. There are many colleagues who don't want to hear about it to the point that in many papers there are people discussing results that are not only coherent with the framework of mirror neurons but really deal with the very same mirroring mechanism in the human brain. Still, they don't dare to bring up mirror neurons because they are afraid of rejection. So, they come up with the alternative way of designating this mechanism like "action observation network" even if we are dealing with motor areas.

Finally, there is another element that probably didn't help in having a more coherent reaction with respect to the heuristic power of mirror neurons: it is the quantity of bullshit in the public media that revolves around mirror neurons. They became an idiomatic jargon to designate phenomena that, as I mentioned, cannot be directly linked to mirroring, like being sympathetic, being altruistic, being good, etc. This hyper-mediatic attention on this neurophysiological mechanism probably wasn't helpful in convincing many colleagues. Besides the fact that controversy is, of course, a common ingredient of science. So, I'm neither surprised nor bothered about the fact that we cannot all converge on the relevance of this mechanism in explaining social cognition.

NL: On the affirmative side, I mentioned Nietzsche for two related reasons: first because the passage in *Daybreak* among many others was the starting point for me to develop a theory of the mimetic unconscious that is embodied since, for Nietzsche, "the body is a great reason." And second because the theory of homo mimeticus is not only in line with Nietzsche's theory of unconscious imitation; it also inherits from him a genealogical perspectivism that recuperates untimely thinkers who were neglected in their times because they were perhaps ahead of their time.

You mentioned earlier that perceptive theories are sometimes overshadowed by other, more dominant theories. The mimetic unconscious is a case in point: it is not based on a repressive, Oedipal hypothesis that is accessed via the interpretation of dreams; nor does it emerge in imaginary identifications with mirror images, or *imagos*. Rather, it is manifest in everyday life in mirroring intersubjective reactions. Nietzsche, in fact, was an avid reader of theories of hypnosis and suggestion that were entangled with the theorists of *Einfühlung* you mentioned and were left in the shadow in the past century. My genealogical sense is that this neglect is at least partially due to the Freudian "discovery" of the Oedipal unconscious. It left in the shadow the pre-Freudian tradition of an embodied unconscious that was sensitive to unconscious imitation.

VG: Yes, in your book you discuss the tradition of thought of the unconscious preceding Freud.

NL: Right. Along with Mikkel Borch-Jacobsen and others in this volume, I find it important to recuperate this genealogical tradition to further mimetic studies. To give you another example as to how close the tradition of the mimetic unconscious comes to your account of embodied simulation, let me quote an untimely physiologist that inspired Nietzsche's theory of a type of embodied suggestion he called "psycho-motor induction." His name was Charles Féré, a physiologist working under Jean-Martin-Charcot at the Salpêtrière in the 1880s. He wrote a book titled *Sensation and Movement* (1887) where he says:

> It is possible that certain subjects who are particularly sensitive to the phenomenon of induction imitate unconsciously [*imitent inconsciemment*] the movements that necessarily accompany the idea of the one in his presence, and will consequently be led to feel the same emotion, the same thought, in a word, to obey what we call *mental suggestion*. (1900, 16; my translation)

Would you agree that this pre-Freudian physio-psychological tradition that has mental suggestion as a main trigger is in line with the theory of embodied simulation?

VG: Yes, indeed. Thanks to the progress of neuroscience also in psychoanalysis nowadays people speak of the unrepressed unconscious, or implicit memory, a sort of background knowledge, resulting from our constant encounter with the world. The dynamic outcome of this encounter affects the plasticity of the brain-body.

NL: If we move genealogically from the late nineteenth century to the dawn of the twentieth century, in your work you paid specific attention to phenomenology. The focus on lived experience and sensitivity to embodied forms of perception, especially central to Maurice Merleau-Ponty but also Edmund Husserl, Michel Henry and others, can indeed be aligned with both the pre-Freudian tradition of the mimetic unconscious and the aesthetic tradition of *Einfühlung* that were neglected in the past century but are now re-turning to the foreground in the present century, also thanks to the confirmation provided by the discovery

of mirror neurons. What led you back to phenomenology? And what genealogical connections are worth stressing to promote what we call a mimetic turn?

VG: The first attention directed to philosophical speculation in relation to mirror neurons was toward phenomenology. Many years ago, I think it was 2004, after Marc Jeannerod published a paper on motor simulation, a French philosopher, Jean-Luc Petit wrote a letter to us, saying: "I'm flabbergasted! You should turn to Husserl! You should read the *Fifth Cartesian Meditation*." So, we invited him, and he gave a talk at our Institute of Physiology, as it was called back then. I was already familiar with the phenomenological tradition, particularly with Merleau-Ponty's *Phenomenology of Perception* in relation to my research on the way we map space, specifically peripersonal space. I was thus already attuned to phenomenology, but there was an incredible boost after the discovery of mirror neurons. I started reading Husserl, Edith Stein, the second book of *Ideas*. Then I dug deeper into Merleau-Ponty. I even approached, although more shily, Heidegger, Michel Henry, in short, many phenomenological thinkers.

I am not a philosopher, but as a neuroscientist what is central for phenomenology is also central for where I think cognitive neuroscience should head to: namely, the notion of experience. But as we speak, most of our colleagues are totally focused on the relationship between the brain and the way we explain the world away, the way we cognize the world. Very few neuroscientists are interested in the notion of experience, while experience is of course central for phenomenology.

More recently I also found very interesting to have a dialogue with American pragmatism, particularly with John Dewey in relation to aesthetics. Although it was written almost a hundred years ago, *Art as Experience* (1934) is a book that is still very useful to understand our relationship with cultural artifacts. I would say that phenomenology on the one hand and pragmatism on the other, as we speak, are two important aspects of philosophy that I am finding highly relevant for my work as a cognitive social neuroscientist.

NL: Closer to us and changing perspective, another transdisciplinary theorist in the humanities who is relevant to discuss the psychological, but also aesthetic, social and anthropological implications of mirror neurons is René Girard. Girard's mimetic theory tends to be exclusively focused on mimetic desire and the violence that ensues, which is an important side of imitation. But as you also point out in an article titled "The Two Sides of Imitation" (Gallese 2011) it is

not the only side, for imitation goes beyond good and evil. In this article you credit Girard's theory of desire as being in line with the intersubjective dynamic of the MNS that opens up the subject to the other—a point also shared by mimetic studies. At the same time, you also balance Girard's unilateral focus on violence with good forms of intersubjective mimesis central to the genealogical tradition we have been tracing.

VG: I had the opportunity and the privilege of becoming personally acquainted with Girard. He organized a seminar that lasted four years: we had two years in Stanford and one year in the Austrian Alps and the final conference in Paris where Girard couldn't attend because he was already ill. In this multidisciplinary seminar on mimesis there were people from many different traditions. One key protagonist beside Girard himself was Andrew Meltzoff, who discovered neonatal imitation. I found Girard's thought fascinating and thought-provoking, particularly if you think where he moved from. He was a comparatist who started from literary criticism and started discussing mimesis in Shakespeare, the double in Dostoevsky, and to build around this literary core a more comprehensive theory of mankind building upon anthropology, psychoanalysis, psychiatry, history, and the like. In a way, he was a man of the Renaissance, a polymath.

And yet, at the same time, the more I delved into his writings and became more acquainted with his model, the more I realized that his idea about mimesis was—in my opinion, and you agree with that, actually you build a well-developed criticism—too one-sided. The mimetic rivalry, which stems from mimetic desire leads to violence that in turn produces the phenomenon of scapegoating upon which the rites and religions are built. This is a possible theory, but reading your last book, *Homo Mimeticus*, it is clear that there are other paths for mimetic studies. With Edgar Morin, for instance, you speak about the likely shamanic origins of paleolithic art in the caves of Chauvet and Lascaux. In our book about the *Empathic Screen* (Gallese and Guerra 2015) with Michele Guerra we do the same: we start with Werner Herzog's documentary, *Cave of Forgotten Dreams* (2010). We both agree that mimesis leads to creativity, social practices, and to the creation of cultural artifacts, which are a trademark of our species. So, I'm totally with you when you pinpoint the one-sidedness of the theory of mimesis put forward by Girard.

NL: Good to hear. Indeed, one of the aims of mimetic studies is to go beyond Girard's theory of violence by considering that not only desire but all affects are imitative. If mimetic desire is the starting point of a quasi-Oedipal triangular

structure of ambivalence and rivalry with a model, I introduce the concept of mimetic pathos to stress the centrality of intersubjective flows of sym-pathos from self to other that are in line with a tradition of the mimetic unconscious, find origins in ancient and modern thinkers, and reach up to mirror neurons.

From different angles we reach similar conclusions. In fact, your claim that "prior to any triangular mimetic relationship, the main object of infants' mimesis is the affective behavior of the 'other'" (Gallese 2011, 97) also seems to entail a distance from universalizing triangular structures. The idea that desire leads to an ambivalent and violent relation with a model, culminating with the hypothesis of a founding murder at the origins of culture is as Girardian as it is Freudian, as I tried to show (Lawtoo 2023). Your theory of the shared manifold of intersubjectivity, on the other hand, is much closer to the dynamic of mimetic pathos. This mirroring pathos ties self to others in intersubjective bonds of affective communication that start with a dyadic relation and tend to generate a network that does not fit a triangular structure.

VG: Yes. Not coincidentally, in *Violence and the Sacred* (1972) Girard stresses that the thinker that came closest to the theory of mimetic desire with the original herd, is the Freud of *Totem and Taboo* (1913). The Oedipal origin of this theory, as you pinpoint in *Violence and the Oedipal Unconscious* (2023), is very clear. I think that one of the more neglected aspects that make *Homo sapiens sapiens* who we are, is our neotenic nature: namely, we are born immature. Consider that our brain at birth weighs a few hundred grams as it reaches the completion of its maturation at the end of adolescence, and in adulthood the final weight is 1300–1400 grams. I do not want to reduce human culture to the weight of the brain; but since I think the brain is necessary, although not sufficient, to understand who we are that tells you a lot. The vast part of the development and maturation of this crucial part of our body happens after birth. And happening after birth also means that it happens within a network of social relations. So, in order to become who we are, we need the other.

NL: Indeed, the other as a condition for survival and communal cooperation rather than of mimetic rivalry seems central to both the development of the child and of the species. Any parent can witness the former, but we shall have to return to the latter in the second part.

II. Shared Subjects: Birth of Homo Mimeticus

NL: The mimetic turn aims to operate a paradigmatic shift of emphasis in discussions about mimesis from representing the world toward the subject, ego, or self and its imitative relations to others. It's a complex subject so apologies for the directness of the question but to get us restarted: how would you define the self?

VG: The notion of the self is a contrastive notion: there is no self without the other, and vice versa. I think that the beginning of our development as selves predates the moment of our birth but starts already in the womb. The first relation we experience is with our mother within whose body we grow and develop. This becomes even more evident if we enjoy the company of someone else in the womb, as in the case of twins. More than ten years ago, with Umberto Castiello we published a study that we entitled "Wired to Be Social."[7] We were able to show that the kinematics of the arm movements of the twins were quantitatively different from the kinematics of the movement that were self-directed or from the exploratory movement where the twins explore the inner walls of the womb. The kinematic features of the movements when they were targeting the other member of the couple had features that when transposed to adulthood suggested that those were the mostly carefully controlled movements. Put differently, when I move my arm toward another human being like me, I need more control with respect to when I touch my body or when I touch an external object, like the inner wall of the womb. And right after birth, we are wired to imitate the adult that we immediately encounter, which most of the time, if we are lucky enough, is the face of our mother.

NL: Interesting. This relational insight entails a reframing of the subject in line with what we propose as well. For a long time, in fact, a western patriarchal tradition also prevalent in ancient and modern aesthetics equated twins with loss of identity and children with phantasies of Oedipal murders of parental figures; the focus of neurosciences, instead, tends to favor life, intersubjective relations based on "'contagious' mimicking" and is sensitive to maternal bonds based on "empathic awareness" (Ammaniti and Gallese 2014, 27, 28). This binary is of course not stable and mimetic studies is currently engaging the problematic of gendered mimesis via feminist philosophers like Adriana Cavarero who also foregrounds "mimetic inclinations" (Cavarero and Lawtoo 2021) tying the

mother the child and vice versa. For the moment, it seems mimesis plays a key role in the birth of the subject.

VG: These results on neonatal imitation cause a problem for some of the most vocal opposers of mirror neurons. For example, the cognitive psychologist Cecilia Heyes tried to reduce the impact and heuristic value of mirror neurons by equating the mechanism of mirroring as one of the many associative mechanisms we can find in our brain. In talks she introduces mirror neurons by showing one of Pavlov's salivating dogs. Heyes has a big problem with neonatal imitation: since there are no mirrors in the womb this seems to suggest that there is a rudimentary form of mirroring that is innate. And being innate defies the idea that all mirroring is simply one of the many associative brain mechanisms. Heyes published papers where she denies the existence of neonatal imitation, which instead is a very solid and empirically documented phenomenon not only in humans but also in non-human primates: it has been shown in chimpanzees, even in macaque monkeys. A colleague, Pier Francesco Ferrari was able to demonstrate not only that neonate macaque monkeys exhibit neonatal imitation but also that when they do so, you see a de-synchronization of the motor part of their brain very similar to the de-synchronization that we spot in human adults' brain when witnessing the action of others.

In sum, mimesis is one of the key ingredients; and it is not coincidental if mimesis is developed to the most extreme level in us humans. In common parlance we say that apes imitate—in Italian we say *scimmiottare*, to ape—but apes and monkeys are very poor imitators in comparison with humans. We are the truly mimetic species, or homo mimeticus, as you say.

Most likely, one possible answer for this discrepancy between human and nonhuman imitation consists in the fact that the "resonating palette," if you allow me the metaphor, in our brain is much wider than in the case of nonhuman primates. As far as we understand, in monkeys mirroring occurs mostly, if not exclusively, for goal-related motor actions. Whereas in the case of the human brain, mirroring also applies to apparently gratuitous movements like raising your arm, jumping, raising your finger. In order to imitate what others are doing you need to copy not only the goal but also the means required to accomplish that very same goal, or final outcome. To do so, you need a mechanism that can replicate not just the goal but also the movements. Apparently, such a mechanism is particularly present in the human brain and less so in the brain of nonhuman primates.

NL: It's very useful that you go back to development of the child, or ontogenesis, as Andrew Meltzoff's experiments provide a confirmation that at the beginning of a species born too soon, as Nietzsche also foresaw, is indeed mimesis. In the *Gay Science,* he also posited a mimetic communication of gestures and facial expressions at the origins of language and consciousness at the level of the development of the species, or phylogenesis. Both hypotheses have been marginalized in the last linguist-oriented century, but the mimetic turn developed in the present, more embodied and affectively oriented century, is currently reevaluating them. Does neuroscience provide any confirmation on those two fronts?

VG: Yes, the standard mainstream cognitive take on what makes us different from other primates, or mammals, is the fact that we have language. This leads some scholars even to imagine, or dream of a *deus ex machina* biological phenomenon like a genetic mutation. Steven Pinker even defined the Foxp2 gene as the gene of syntax. I think we should bring in a psychoanalyst here to explain why we need to sanitize the body and explain who we are exclusively in logocentric terms. Language, of course, is an ineludible part of who we are. You can't get away from language because we grow into language and, in a way, language deeply affects all the embodied mechanisms that lead us to language. But both from an ontogenetic and from a phylogenetic point of view, you can have cognition without language. And language is an expression or exaltation of mechanisms that are not strictly speaking linguistic. You note that in *Homo Mimeticus*, when you say it's a long story that begins with *Homo ergaster, Homo habilis, Homo erectus* where most likely language as we think of it, was not yet in place. And yet, these hominins were able to build tools. So, they had a social structure; they most likely were imitating others; they had cultural practices that were passed from generation to generation.

NL: Do you also think that mirror neurons played a role in the development of language then?

VG: Yes, I think so. One part of my research and of other colleagues of mine specifically deals with the relationship between the body and language. For example, years ago with George Lakoff, we put forward the idea that concepts can be embodied. The title of the paper was "The Brain's Concepts." And as we speak, we are investigating an apparently very abstract aspect of human language, which is negation: a logical operator that apparently has nothing to do with the body. We are exploring the possible relationship between linguistic negation

and motor inhibition. This tells you how closely related I think embodiment, mirroring, embodied simulation, and language are.

NL: Both your theory of embodied simulation and mimetic studies stress humans' ontological openness to the other: namely, the fact that the subject comes into being in a shared experience of mimetic communication with privileged others, the mother *in primis*—what the philosopher and psychologist Pierre Janet called a *socius*. Before Meltzoff, Janet argued late in his career that psychologists focus too much on the individual and should pay more attention to intersubjective relations between self and others—what he also calls "psychology of the socius."[8] In a diagnostic evaluation of this psychology for the future that ties the newborn relation to the mother via imitation, he writes almost a century ago:

> The two personalities, the one of the subject and the one of the socius, emerge together in a confused matter. . . Here we come to what may seem to be a paradoxical idea. Namely, that the distinction between persons, between myself and the socius, is not as fundamental and primitive as we thought it was, and that there was a period, of which there are still traces, where my person and my acts were confused with the person and the acts of others. (Janet 1938, 145)

Does this mimetic hypothesis now find support in contemporary neurosciences?

VG: Yes, of course. A figure that influenced me a lot and that pointed me toward developmental psychology and infant research was Daniel Stern, particularly his book *The Interpersonal World of the Infant* (1985). Together with other psychologists like Edward Tronick or Colwin Trevarthen, for instance, Stern was fundamental to understanding what being human really means. The title of his book betrays the crucial importance of relations in developing our own personal identity, which is not a given. There is no box in the brain where the self sits. If you ask me what the self is about, in the first place, I see the self as a dynamic process. That is, a dynamic process of constant molding and remodeling through the variety of social relations we entertain with others. This is one of the few things I have no doubts about.

NL: It's reassuring to know. In fact, one of the fundamental hypotheses of homo mimeticus is that intersubjectivity is not added to the self or ego but is

constitutive from birth onward. There is an ontological openness toward the other, as you also emphasize. This openness is as present in the phenomenological tradition as in thinkers and writers in touch with the body more generally. That is why I appreciate your focus on "intercorporeity" as foundational.

VG: Think about the experiment of Ed Tronick about the still face. Take a video footage of a couple: a neonate and her mother. They are cheerfully playing, exchanging vocalization, making smiles, and gestures. Then, suddenly, the mother is instructed to stop moving, to freeze and to keep an amimic facial expression. You see then that at first the neonate is very surprised about this sudden change in the behavior of the mother. He or she tries with all their means to reengage the mother into the dialogue. When the neonate realizes that all these attempts do not produce any results, he or she starts displaying a stressful reaction, starts crying etc. Many mothers are incapable of remaining still for three minutes, as required by the experimental protocol. This tells us how naturally attuned to the other we are, from very early on. As Max Scheler wrote in *The Nature of Sympathy* (1923), also the way we read our own emotions greatly benefits from the relation we have to other human beings. We literally learn to understand our inner state by interfacing with the other.

NL: Yes, indeed, this constitutive openness to mimetic pathos is *the* fundamental aspect of homo mimeticus. At the same time, as we develop, we also learn to put ourselves at a distance from the pathos of the other via what I call, echoing Nietzsche again, "pathos of distance." In the most acute thinkers and writers of imitation I studied over the years, I found a tension or oscillation between on the one hand, an openness to pathos that favors the sharing of affects, and, on the other, a critical distance that preserves individuality. This double movement of "attraction and repulsion," as Georges Bataille called it, seems fundamental for the emergence of a mimetic yet distinctly unique subject. If mirror neurons contribute to making us unconsciously feel the pathos of the other, I was wondering, then, at the neurological level, what mechanisms allow for the emergence of a more conscious distance? Is there a neurological support to account for this double movement of pathos of distance, mimetic and anti-mimetic tendencies that provides a palpitating heart to mimetic studies?

VG: This is one of the aspects of our research which I find the most difficult to communicate. It is difficult in itself and there are some paradoxical aspects to it. I don't like this spatial metaphor but since everybody uses it, I will use it

to facilitate understanding. On the one hand, we have a bottom-up proclivity to simulate, responsible for the immediacy of this mirroring mechanism, of the unconscious nature of the embodied simulation in our brain and in our body when we are confronting the behavior of others; on the other hand, there is a top-down braking system that prevents you to be turned into an echopractic individual who involuntary mimics others. If you display echopraxia you're a patient. Often described by neurologists, echopraxia stems from a degeneration of the most anterior part of the frontal lobe. The idea is that this mechanism stops being subjected to the top-down gating.

One area where this top-down gating inhibition becomes less successful concerns the domain of emotions. If I see you grasping that sheet of paper on the table, unless I'm an echopractic patient, I won't immediately imitate what I see you doing. But if you start laughing, there are very good chances that my zygomaticus major muscle will start to activate in a way which is beyond my control and of which I'm most of the time totally unaware. Mirroring comes in degrees. The results of my empirical investigation suggest that the aspect of behavior where this inhibitory control is less effective is the one of emotions. In the domain of action, we do not automatically imitate unless we do it for the purpose of learning some skill. In that case we are instructed to reproduce exactly what we see. Where are we to locate this control mechanism? Most likely, in the prefrontal cortex: through its connections with the basal ganglia it plays a major role in restraining us from automatically imitating whatever we see.

The same applies to our relation to manipulable objects. Before mirror neurons we discovered a class of premotor neurons we later designated as "canonical neurons" that control the execution of goal-directed grasping behavior: grasping, manipulating, or placing objects. It was discovered that the very same neurons that control the grasping of the object can be activated also by the mere observation of that object; even when you don't have any purpose of actually interacting with the object. So, this activity is a simulation of the movement that you do not perform. The movement is inhibited, but this motor simulation is part of the neural mechanisms that contribute to giving meaning to that object. Hence, that object is the object that it is—be it a glass, a fork, hammer or whatever—not just because of its size or shape but also for its pragmatic intrinsic value. The pragmatic meaning of the object is the outcome of a motor simulation. There are neurological diseases in which if you put a comb in front of the patient the patient will automatically grab it and start combing his or her hair. It's called "utilization behavior." Again, you see a motor simulation that is no longer inhibited that is turned into ostensive behavior. But it's a pathology; we normally don't do that.

NL: Interesting. There is then a neurological top-down/bottom-up mechanism responsible for the oscillation or double-movement between pathos and distance, mimetic and anti-mimetic behavior. Your empirical findings support my hypothesis that it is indeed the sphere of pathos or emotions that is less under the control of top-down, more cognitive, critical distancing.

VG: Right. There are also social influences that are all funneled into our brain. So certain types of behavior are perfectly legitimate in certain cultures. Like making noises with your mouth when you eat noodles in a Japanese restaurant, for instance. I lived in Tokyo for two years and at first, I was a bit surprised to hear these noises. Japanese often don't refrain from it because they claim that by making this noise, you're in a better position to appreciate the taste of the soup. On the other hand, I immediately realized that you don't want to blow your nose with a tissue on the subway because immediately everybody will stare at you!

We are social creatures. Much of our behavior is shaped by mimesis that enables you to perform like the others do. But this mimetic behavior is in turn the outcome of cultural habits and social practices. The body is always the protagonist. But what the body expresses is in turn governed by rules dictated by what the bodies of others are doing. What we call social practices. It is a sort of chiasmatic relationship between my body and the body of others. As for the mirroring mechanism we have been discussing so far, in my opinion, you can't get away without it if you want to understand the social dimension of human beings.

NL: This is exactly the focus of mimetic studies. You also provided the perfect transition to my next question for the third and last part of this dialogue.

III. Reflecting on the Brain-Body: Interdisciplinarity, Experience, Hypermimesis

NL: When it comes to engaging with the neurosciences, one of the fears of scholars in the humanities concerns the double phantom of reductionism and essentialism. From different perspectives, whenever philosophers, anthropologists, historians, or literary theorists address a cultural phenomenon, we argue for the importance of contextualization, specific technical and cultural competences, and sensitivity to social differences in terms of gender, race, class, sex,

nationality, and other social categories. In your work, you are mindful of the trap of reductionism. You have, time and again, stressed that neurons are not epistemic or cognitive agents and do not answer all questions operating at the personal and intersubjective rather than subpersonal level. Still, as disciplinary suspicions tend to operate not only consciously but also at the level of the mimetic unconscious, a repetition might help further interdisciplinary exchanges.

VG: Indeed. Well, let me first make this statement, which at first might sound a bit rude. For many years, we have both been engaged in a multidisciplinary take on our specific field of investigation: in your case, it is literature, cinema, philosophy; in my case, it is the brain and the body. In order to do so we had to study a lot. We had to become acquainted with traditions of thought that are not naturally part of our original background: you studied mirror neurons; I studied Girard, Merleau-Ponty and many others. This enterprise takes a lot of time and effort. The majority of our colleagues don't want to do this—perhaps out of laziness, perhaps out of territorial reasons. But dealing with complex questions like "who are we? What does it mean to be human?" encourages us to try hard to see things from a variety of perspectives, moving from the conviction that each singular perspective adds to the picture. Still, when confronting scholars in the humanities, I often happened to be addressed with sentences like: "Oh you're mechanistic! You are a reductionist! These reflexes have nothing to do with culture" etc. These are shortcuts. What really surprises me is the fact that most of these scholars have a very superficial knowledge of what we are talking about. At best, they read the titles or the abstracts most of the time misunderstanding the content. They're talking about something they really don't know. It's easier to wipe off the table a cognitive neuroscientist by saying: "It's mechanistic. It's reductionist."

Of course, we are reductionists, but in methodological sense and not in an ontological sense. I owe this distinction to my friend philosopher Thomas Metzinger. I think it's a very useful distinction between methodological and ontological reduction. I *cannot* be an ontological reductionist because as a neuroscientist I'm the first to know that what's going on inside my brain is just spiking neurons, electricity phenomena. Neurons don't think, don't imagine, don't experience emotions. Nothing of this vocabulary can be attributed to neurons. Neurons either fire or do not fire. And when they fire, they can modulate the frequency at which they produce spikes. Period. All this vocabulary, as you said, refers to the personal level of description, which includes the neurons, the liver, the heart, breathing, the world to which we adapted. We have the force of

gravity, for instance, and it's not coincidental that we developed spatial metaphors, so up is good, down is bad, and I could continue.

In sum, the first element to retain is that we are embedded in the physical world that provides a series of constraints on the way life developed on our planet. The second element is that the brain is fully integrated within the entirety of our body. The more we study the brain, the more we discover how this intertwining affects the way the brain reacts to what we designate as external stimuli. There are now more and more neuroscientists, me included, that are studying the interplay between the heart and the brain, between the brain, the heart and the breathing system. Even within the West, almost a century ago, neurologists like Kurt Goldstein—not coincidentally very influential to Merleau-Ponty—presented this more holistic scenario. If you move to the oriental tradition, holism is the rule of the game. And I think that moving from a completely different background with completely different tools and ways of asking questions to human beings, we will converge with the oriental tradition. We don't speak of chakra or meridians. We have a totally different cartography, so to speak. But the more we investigate the brain in relation to the body, the more we envisage the brain not as a magic box in which all kinds of wonders happen but how fully integrated the brain is with the rest of the body. This is one of the reasons why I don't speak of the brain anymore, but I always speak of the brain-body as a unity.

NL: In the context of this brain-body unity then, experience, as you already mentioned, plays a key role in shaping the plasticity of the MNS. Could you then address the relation between the evolutionary foundation of mirror neurons that are supposedly present from birth and the socio-cultural role of sensorimotor experience in the development of what philosophers call consciousness, or self.

VG: In that respect, recently in the media you could read that twenty-five years later, philosophy beats science one to zero. In 1998, there was a bet in Tucson, and I was there. It was an international conference titled "Towards the Science of Consciousness." The philosopher was David Chalmers, and the neuroscientist was Christoph Koch. Koch said that in twenty-five years I'm pretty sure that we will solve what Chalmers defined as the "hard problem:" namely, how out of this billions of spiking neurons experience is generated. Well, twenty-five years later, we don't know yet. This still remains an unsolved mystery. It is not foreseeable whether and when this mystery will be solved. That's the reason I think that tackling human behavior from the vantage point of experience is so

important. It has been done for another apparent transcendental entity, which is space. Space is by no means transcendental. It's the outcome of the relation of our bodies to the world. We don't speak of space anymore, but we speak of peripersonal space, extrapersonal, space being mapped by the brain in egocentric coordinates, in allocentric coordinates, etc. I always resisted to deal with consciousness with a capital C.[9] I would rather unpack or reduce the complexity of the term into methodologically more manageable entities. To come back to your question, this methodological reduction is the only possible strategy for someone who wants to do empirical science. The trick, then, is to go back to the personal level of description and see what we have learned about the question that we formulated, going through this methodological reduction. This entails asking questions of the brain to the heart, or to the brain-body.

NL: For instance, it has been shown that experience, let's say in playing sports has an impact on the activation of mirror neurons. Say, if somebody is a dancer or a soccer player, their MNS will activate more significantly if they see, respectively, a dance or a game of soccer. There is thus not only a genetic but an epigenetic development that molds the receptivity of the MNS.

VG: Yes, of course. There's plenty of evidence that mirroring mechanisms are the outcome of who you are, which in turn can be translated into the type of experiences that you have had in your life. If you are trained as a classic ballet dancer, the mirroring mechanism responds more vigorously to classic ballet than to capoeira; and vice versa if you are a professional capoeira dancer you see the reversal of the intensity of the activation; and both respond more heavily than a naïve observer who doesn't know how to dance. It's the life experience that literally carves molds in a plastic way the way these mirroring mechanisms are functioning.

NL: So, it's the opposite of essentialism.

VG: Of course. To me the only essential thing that I cannot reduce to something simpler is the body. I don't think I will give up the body. I can give up a more traditional notion of representation, although I resist the idea that we can entirely get away with something that in another domain can be defined as a representation. For example, I think you can speak of representation not just in linguistic terms but also in bodily format. You don't want to call it representation? OK, let's call it mapping. You can come up with different terms. But there must be

something that kicks in also when there's nothing out there, for example when you imagine something: so imagination is another form of simulation.

NL: Mapping or simulation are indeed a better alternative to representation that in its multiple meanings (metaphysical, imaginary, or artistic) privileges vision over all the other, more bodily senses—a problem internal also to the trope of the "mirror" once central to Jacques Lacan's mirror stage and now at play in mirror neurons, which are not restricted to vision, as you explained. To continue the discussion on experience and simulation: since so far mimetic studies and embodied simulation provide two faces of the same Janus-faced homo mimeticus, let me try to anticipate some agonistic questions that might emerge in the future, as we continue to further the mimetic turn across body-brain binaries.

The tradition of hypnosis I mentioned early on reminded me of the risk of simulation emerging from intersubjective mimetic experiences. At the end of the nineteenth century there was a debate between Jean-Martin Charcot at the Salpêtrière in Paris, who argued that hypnosis was restricted to hysterical patients who displayed stereotypical symptoms like somnambulism or catalepsy, whereas Hippolyte Bernheim of the School of Nancy argued that Charcot's patients were simply simulating, like mimetic actors, the symptoms Charcot's theory expected them to display. I am not implying that the same type of simulation is at play when the activation of mirror neurons is measured for this occurs at the subpersonal, unconscious level, as you explained very clearly. However, given your phenomenological emphasis on the body and the fact that you have yourself been critical of the imprecise measurements of fMRI scans that only measure the MNS' activation via the presence of oxygen in relatively large areas of the brain, I was wondering: could the specific *bodily* position of a subject within a fMRI [functional magnetic resonance imaging] scanner—the horizontal position, focus on specific images or sounds, isolation from others, and thus brain-bodies not in a natural, or rather natural-cultural interpersonal relation—doesn't somehow all this artificial context operating on bodily dispositions have the potential to amplify (or diminish) mirror neuron activation?

VG: Well, as I always keep telling my students, when we want to understand something of the human condition by relying on a neuroscientific approach—which boils down to putting people into a fMRI scanner, so lying down or recording the electrical activity of the brain by means of the MEG or magnetoencephalography, which means sitting on a chair—it is like looking at the world through a peeping hole. It's an incredibly artificial situation, which only vaguely

resembles real life situations. This is the best we can do with the current technological limitations. For example, nowadays in the case of the neuroscience of non-human primates there are chronically implanted recording devices that enable you to record brain activity wirelessly from macaques when they are freely able to behave in a room like this one: with no constraints, not sitting on a chair, not with the head fixed but behaving, well, not entirely as they would do in the wild, but still with a much higher degree of ecological plausibility. This type of solution is not yet available in the case of humans, but I'm quite optimistic. When I started this career there were no such things as fMRI or MEG, TMS [transcranial magnetic stimulation], there was nothing, just single-neurons electrophysiology in experimental animals and a very crude type of electroencephalography in humans. Now we have all this new technology. I think the ultimate goal is to test the brain-body in a situation that is more ecologically plausible.

That said, are we influenced by this technological apparatus? Well, there are studies that were able to demonstrate its reliability through repetitive recordings of brain activity at different times, and simultaneously mapping the plasticity of the response. In fact, we are having experiences that, in turn, affect the way our brain-body responds to what we are exposed to. In sum, even considering the artificiality and poor ecological plausibility of the approach, I think we still can understand a lot despite the present limitations.

NL: I have another, perhaps provocative, question on the discovery of mirror neurons, which was purely accidental...

VG: Absolutely serendipitous.

NL: At the same time, you also said somewhere that the Parma team was ready for this discovery, asking the right questions, so to speak.

VG: Oh yes, by all means.

NL: So, here comes the provocative, culturally oriented question: is it a coincidence that this important discovery took place in Italy first, and that some of the most important mirror neuron theorists often come from oral cultures that rely more on embodied forms of communication? It's a stereotype but there is some truth in it: as an Italian speaker myself who then moved to Nordic countries, I can certify from experience that Italians communicate a lot more via gestures and facial expressions than, say, British, Scandinavian, or even North American

people. Could it be that a culture that is more immersed in embodied modes of non-verbal communication helped to put the brain-bodies of the Parma team in a position to be more sensitive, attuned, or ready to discover this phenomenon, which after all, implicates the scientific observer in what is observed?

VG: This is indeed a rather provocative question. Rizzolatti was born in Kiev from a second-generation Italian father and a Russian mother. We are still within the realm of continental Europe in that respect. I think that more than nationality what makes the difference is the scientific cultural tradition and the method put forward by Rizzolatti. I started working as an intern in his lab in 1979, so we go way back. His method was revolutionary. The standard methodology was to train the monkey to perform a given task, while recording simultaneously the single neural electrical activity, and correlating the two off-line. Our approach was completely different due to our training. Rizzolatti came from neurology and neuropsychology, the study of human patients, so he tried to apply the same methodology to neuroscience. In the lab jargon, what we were doing was applying a 'clinical study' of the neurons. This entailed not just asking one question and seeing how many of the neurons correlated or not with their responses to their single question. Rather, we were trying to ask as many questions as possible.

For instance, while testing motor properties in the motor part of the brain we were also testing sensory properties, tactile properties, auditory properties, visual properties, etc. Of course, you cannot ask all the possible questions, which are potentially infinite. Still, we did our best to ask as many questions as possible to the neuron we were recording from, to fully understand the functionality going on in that part of the brain. And it was by applying this methodology that motor neurons guiding, orienting or reaching movements turned out to be responsive also to touch and to visual stimuli, moving around the same body part. This led to the discovery that vision can be mapped in the brain not only in a retino-centric or oculo-centric frame of reference but also in a body-centered frame of reference. A few years later, this then led neuropsychologists like Marshall and Halligan to test hemi-spatial neglect in human patients asking questions that were never asked before. For instance, can this neglect be dissociated for peripersonal and extrapersonal space, as Rizzolatti had demonstrated experimentally in nonhuman primates—and they discovered that also in humans.

If you don't ask, of course, you don't have answers. So this methodology is the outcome of a particular way of doing neuroscience that is related to the fact that most of us were Doctors of Medicine (M.D.s) and trained as neurologists: Massimo Matelli was a neurologist, Giovanni Pavesi was a M.D., Rizzolatti

was a M.D. trained as a neurologist, Luciano Fadiga was an M.D., Giuseppe di Pellegrino who's the first author of the first paper on mirror neurons was himself a M.D and a neurologist, so am I. In sum, you look at the brain very differently with the medical background with respect to if you come from computer science, psychology, or other disciplines. You ask different questions, and it's a pity that fewer and fewer M.D.s dedicate themselves to neuroscience.

NL: Thanks for this important methodological clarification. A side of me—probably the Nietzschean one—continues to suspect that culture might be operative in unconscious ways in the body-brains of perfectly trained, well-rounded M.Ds., generating *patho*-logies in which the bodily pathos helps inform or direct the scientific logos and techne of medical doctors. But I might myself have been biased by philosophical physicians here. Your mirroring point as a physician-philosopher is well-taken and equally in line with mimetic studies: namely, that depending on the scientific training and formation thinkers and scientists develop a different diagnostic logos on mimetic pathos, or patho-*logies*. From either side of the brain-body, pathos-logos, connection we have indeed a mirroring diagnostic that informs bodies and minds, individually but also collectively, in a scientific team or at the broader social level.

To now shift perspective from the individual to the collective level, another major context that reveals with striking clarity the all too human tendency to imitate, often unconsciously, is what was once called mass or crowd (*foule, folla, Masse*). In the late nineteenth century, across Europe there was a discipline that emerged to study crowd behavior, namely crowd psychology, and mimetic studies is currently revisiting this tradition. Still today, in fact, immersion in a crowd seems to have a physio-psychological effect on our bodies and brains that make us more vulnerable, often unconsciously, to what an entire tradition in crowd psychology, drawing on a medical terminology, called "contagion." Obviously, it's more difficult to measure empirically the activity of the MNS in a crowd, so most neuroscientific experiments tend to focus on individuals. At the same time, I have read that you recently developed an experiment on the role of emotions in cinema.[10] What were the findings?

VG: Now a hot topic in social neuroscience is synchronization not just of brain activity but also of heart activity, when for instance, a group of people behaves in a similar way, or are exposed to similar stimuli. A couple of years ago we recorded heart activity in a group of spectators that were looking at an actor-based performance and published a paper about it. We were able to show that there

was a significant correlation between the way these people aesthetically evaluated the performance they attended to, and the way their heartbeats synchronized. The more the heart synchronized during the performance, the more they later evaluated aesthetically the performance in a similar way.

A colleague of mine, Luciano Fadiga, is now studying the reception of music in an audience by monitoring with an infrared thermal camera the variation of the skin temperature of the faces of the spectators. What you see is that in topic moments of the musical performance they synchronize: the color of their skin changes simultaneously, which means they are most likely undergoing similar emotions. I would definitively say that living an experience as a member of a crowd amplifies the experience. I mean if you watch a football game alone sitting on your couch or sharing the experience in the stadium, there's no match. It's completely different. Similarly, watching a movie in a movie theater when it was still fashionable clearly amplifies your reaction. I remember when I was a kid seeing a funny movie in a movie theater sometimes meant you had to go twice. In fact, the first time you couldn't hear the sentences that were crowded by the laughter spreading all over the audience. The same occurs with other emotions like fear. There is thus a multiplying factor that stems from the fact that a given experience is shared by many others.

The neuroscience of this sharing of experience is moving its first steps, mainly for technological reasons. If you ask me, I would like to record simultaneously from fifty people in a movie theater or in a concert hall, but I do not have the means to purchase fifty EEG [electroencephalogram] caps. It's very expensive and it requires a lot of people, but it's technically already feasible in principle. I think that the more noninvasive methodologies will be developed, the more we are going to see neuroscientists investigating what interests you—a very important aspect of mimesis—which is the added value of the people with whom you shared the experience.

NL: I look forward to that! To move toward a conclusion, this leads directly to your work on cinema. You have written a beautiful book with film scholar Michele Guerra titled *The Empathic Screen* (2015) that draws on both mirror neuron theory and film theory to open up what you call "experimental aesthetics" (2015, xviii). This is a promising area for further dialogues with mimetic studies. Cinema is, of course, a mimetic medium in the sense that it represents reality, but cinematic mimesis also operates on the body-brains of homo mimeticus. What are the main insights that emerge from this book? And can you explain how cinematic techniques like camera movement, angles, sound etc.

generate an embodied simulation that chains us to screens and leads to sharing emotions with fictional characters?

VG: One of the many aspects that I really enjoyed in *Homo Mimeticus* is when you underline several times that when we speak of mimesis we should leave behind the stereotypical account of mimesis of a passive and mechanistic reproduction of what is being imitated. Instead, you underline the creative, and active aspect of mimesis that sets into motion practically all parts of our brain and of our body. Of course, the same occurs when we experience movies. This, again, has been intuited a long time ago. With the guidance of Michele Guerra, who is a film theorist, I discovered how early on psychologists were interested in the impact that the cinema had on spectators. Hugo Munsterberg is one of the most interesting examples. Already in 1916, a few years after cinema was invented, he writes *The Photoplay,* where he asks himself: "why is cinema so powerful? why is cinema driving so many people going to the movies? why it's so effective?" Because it pulls the very same strings that are pulled by reality. However, just because cinema is a cultural artifact with all the technicalities like editing, camera movements, the use of sound, editing, close-ups, it reconfigures reality through mimesis—in cinema but also in literature or in painting—we acquire new knowledge about the world and about ourselves.

So that's why I think that you properly stress that mimesis cannot be reduced to a mere passive replica of what is already out there. Art and cinema are artistic forms of expression. They are artistic specifically because they reconfigure vision, hearing, in such a way that enables us to approach both reality and us in a different way. It tells us something prosaic reality cannot tell us. It makes visible the invisible to paraphrase Paul Klee in a different artistic domain. But the way it works is always through the very same mimetic mechanism that enabled us to relate to prosaic reality; it is the very same palette, which is being put into action, although differently because the context in which we watch a movie is completely different from the way we relate to emotions and actions in our daily activities: we are still; we are in a dark room; we share the experience with others. All these elements most likely potentiate embodied simulation, the mimetic mechanism that is at the core of the way we relate to feature films. It turns embodied simulation into "liberated embodied simulation."

NL: In fine, let me ask you a future oriented question concerning technology, which is changing very quickly and calls for additional interdisciplinary bridges between the humanities and the neurosciences I foresee will animate

new mimetic studies in the years to come. In many ways, cinema is an art that culminated in the past century, just like the novel culminated in the nineteenth century. After the digital revolution and the spread of the Internet in the present century, other new media are now omnipresent and literally at hand. I am thinking of hand-held devices like the smartphone that accompanies homo mimeticus on an everyday basis and amplifies our mimetic dispositions, rendering us hypermimetic. New media do not connect us via traditional face to face embodied interactions but via the mediation of online simulations that may be hyperreal, as Jean Baudrillard stated. I prefer to call it hypermimesis for these simulations retroact on the still embodied nature of human brain-bodies, for good and ill. We are actually generating this double strategy right now for good reasons, via an embodied conversation captured on camera by a digital medium that will create both a written and an online simulacrum that, in turn, will hopefully reach other embodied subjects on the other side of the page-screen. Can you comment on both sides of hypermimesis and perhaps link it to your most recent book project?

VG: I think postmodern thinkers like Guy Debord and Baudrillard were foreseeing something that is now our common experience on a daily basis. In a way, they were prescient. I think they correctly pointed out that with the development of a certain technology or within a particular economy—financial capitalism we would designate it today—it is possible to build a replica of reality that becomes more real than reality. You point out, however, that this doesn't mean that these simulacra are not mediated by the very same mechanisms of mimesis affecting homo mimeticus, and I think you're totally right. Just because I fully agree with you on this point, this opens up a lot of questions about what we know about how this new technological *dispositif* works.

You were mentioning the smartphone. Well, the smartphone introduces at least two novelties with respect to more traditional technological devices that mediated our experience of audiovisual content: first, it's held by our hands, which means the experience occurs systematically within our peripersonal space. This is the space of proxemics; it is the space we were defending from the intrusion of the virus during the climax of the COVID-19 pandemics. It is thus a space that is mapped differently by our brain-body with respect to the far space where we normally have most of our audiovisual experience, be it a big screen in a movie theater or the TV set when we watch TV sitting on the couch. We don't know anything about this new form of mediation. To which extent does the experience of audio-visual contents when it occurs within this peripersonal space

produce a different emotional impact with respect to experiences occurring far away from our body?

Second, we need to consider the new performativity of vision. With the TV set we have a control of the content by using the remote control, which is a technological device; in cinema we are totally passive, we see what's going on the screen and have no control; with the smartphone the control is represented by a part of our body. That's the reason I coined the term "the skin-screen:" the screen of the smartphone is like a skin that we touch with a part of our body, our fingers. All the haptic metaphors that were introduced in the aesthetic debate become literal. Bernard Berenson, for example, speaks of the haptic quality of Giotto, which makes Giotto a better painter than his master Cimabue. Or within film theory the phenomenology-inspired theories of scholars who speak of the haptic quality of cinema. Now these haptic qualities become literal because we literally touch the screen.

So, does this periodic performativity of vision have an impact with the way we understand and experience the content we behold through the touch-screen, or not? We don't know. On these topics I wrote an entire ERC project that failed; they didn't like it, so I didn't get the grant, but I will unpack it in in separate different projects. We started already with the part on the impact of auditory immersion in modulating the response of the brain to audiovisual content; the next step will be specifically to investigate this new quality of audio-visual experience mediated by mobile touch-screens as techno-prosthesis of our body to see whether they introduce modulation and of what kind. This is what's coming next in our lab. I'm also writing a book on the impact of digital technologies on subjectivity and on who we are becoming. It will be an exercise of balance, trying not to be too apocalyptic—although it's quite difficult.

NL: Thank you. Cutting across brain-body-cultures divides, we will certainly have to keep thinking about the two patho(-)logical sides of hypermimesis at play on a variety of touch-screens. I very much look forward to your book that will help us in *Homo Mimeticus III*, provisionally subtitled, *Plasticity, Mimesis and Metamorphosis*.

Notes

1 See, for instance, Lawtoo 2019.

2 This interview was originally conducted in July 2023 in Parma as ep. 9 of HOM Videos available here: https://www.youtube.com/watch?v=zmb52PNtrF0. It was subsequently transcribed and revised for written publication. I would like to thank Vittorio Gallese for

his hospitality on a warm summer day, for the inspiring discussion, and for joining forces with mimetic studies, both at the conference and in Parma.

3 See Gallese and Goldman 1998.

4 See Gallese 2001, 42–43.

5 See Gallese 2007.

6 For a more detailed discussion of this passage see Lawtoo 2013, 38–45.

7 Castiello et al. 2010.

8 On Janet's "psychology of the socius" see Lawtoo 2013, 266–280.

9 For a recent account of the "social bodily self" and its relation to "peripersonal space" see Ferroni and Gallese 2023.

10 See Kaltwasser et al. 2019.

Bibliography

Ammaniti, Massimo, and Vittorio Gallese (2014). *The Birth of Intersubjectivity: Psychodynamics, Neurobiology, and the Self*. New York: W. W. Norton & Company.

Castiello, Umberto, Cristina Becchio, Stefania Zoia, Cristian Nelini, Luisa Sartori, Laura Blason, Giuseppina D'Ottavio, Maria Bulgheroni, and Vittorio Gallese (2010). "Wired to Be Social: The Ontogeny of Human Interaction." *PLoS ONE* 5.10, e13199.

Cavarero, Adriana, and Nidesh Lawtoo (2021). "Mimetic Inclinations: A Dialogue with Adriana Cavarero," in *Contemporary Italian Women Philosophes: Stretching the Art of Thinking,* eds. Silvia Benso and Elvira Roncalli. Albany: State University of New York Press, 183–199.

Féré, Charles (1900). *Sensation et mouvement: études expérimentales de psycho-méchanique*. 2nd ed. Paris: Félix Alcan.

Ferroni, Francesca, and Vittorio Gallese (2023). "Social and Bodily Self: Conceptual and Psychopathological Considerations," in *The Routledge Handbook of Bodily Awareness,* eds. Adrian J. T. Alsmith and Matthew R. Longo. New York: Routledge, 522–541.

Gallese, Vittorio (2001). "The 'Shared Manifold' Hypothesis: From Mirror Neurons to Empathy." *Journal of Consciousness Studies* 8.5–7, 33–50.

——— (2007). "Embodied Simulation: From Mirror Neuron Systems to Interpersonal Relations." *Novartis Found Symp.* 278, 3–12.

——— (2011). "The Two Sides of Mimesis: Mimetic Theory, Embodied Simulation, and Social Identification," in *Mimesis and Science: Empirical Research on Imitation and the Mimetic Theory of Culture and Religion*, ed. Scott R. Garrels. East Lansing: Michigan State University Press, 87-108.

Gallese, Vittorio, and Alvin Goldman (1998). "Mirror Neurons and the Simulation Theory of Mind-Reading." *Trends in Cognitive Science* 2.12, 493–500.

Gallese, Vittorio, and Michele Guerra (2015). *The Empathic Screen: Cinema and Neuroscience*, trans. Frances Anderson. Oxford: Oxford University Press.

Hickok, Gregory (2014). *The Myth of Mirror Neurons: The Real Neuroscience of Communication and Cognition.* New York: W. W. Norton & Company.

Janet, Pierre (1938). "Les conduites sociales, " in *Onzième Congrès International de Psychologie*, eds. H. Pieron and I. Meyerson. Paris: Alcan, 138-149.

Kaltwasser, Laura, Nicolas Rost, Martina Ardizzi, Marta Calbi, Luca Settembrino, Joerg Fingerhut, Michael Pauen, and Vittorio Gallese (2019). "Sharing the Filmic Experience: The Physiology of Socioemotional Processes in the Cinema." *PLoS ONE* 14.10: 1–19.

Lawtoo, Nidesh (2013). *The Phantom of the Ego: Modernism and the Mimetic Unconscious*. East Lansing. Michigan State University Press.

——— (2019). "The Mimetic Unconscious: A Mirror for Genealogical Reflections," in *Imitation, Contagion, Suggestion: On Mimesis and Society*, ed. Christian Borch. New York: Routledge, 37–53.

——— (2023). *Violence and the Oedipal Unconscious: vol. 1, The Catharsis Hypothesis.* East Lansing: Michigan State University Press.

Nietzsche, Friedrich (1982). *Daybreak*, trans. R. J. Hollingdale. Cambridge: Cambridge University Press.

Pitts-Tylor, Victoria (2013). "I Feel Your Pain: Embodied Knowledges and Situated Neurons." *Hypatia* 22.4, 853–868.

Plato (1963). "*Republic*," trans. Paul Shorey, in *The Collected Dialogues of Plato,* eds. E. Hamilton and H. Cairns. Princeton: Princeton University Press, 575–853.

Rizzolatti, Giacomo, and Corrado Sinigaglia (2008). *Mirrors in the Brain: How Our Minds Share Actions and Emotions*. Oxford: Oxford University Press.

Tarde, Gabriel (2001). *Les lois de l'imitation*. Paris: Seuil.