

ARTI PERFORMATIVE E NEUROSCIENZE: CORPO E SPECCHI NELL'ESPRESSIVITÀ TEATRALE.

PERFORMING ARTS AND NEUROSCIENCE: BODY AND MIRRORS IN THEATRICAL EXPRESSIVITY.

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Abstract

Neuroscience, pedagogy and theatre: different epistemologies which, through dialogue, reflect each other from different perspectives, generating openings and multiplying meanings. They create links, networks, relationships of meaning and offer people creative and resilient strategies capable of generating beauty through the creation of shared spaces of action. In the pedagogical relationship between actor and spectator, theatre is an *ephemeral* but *lasting* experience, which leads to the transformation of the parties involved in a *harmonic dance step* in which attention, empathy, intention, affordances and ambiguity are involved. In the *potential theatrical* space, through the mechanisms of embodied simulation and liberated simulation, the subjects mirror each other, in a common resonance. The knowledge of the activation processes of the cortico-spinal pathway that induces movement allows to illuminate the dialogue and offers important contributions in the educational and didactic field.

Neuroscienze, pedagogia e teatro: differenti epistemologie che, dialogando, si rispecchiano e riflettono da diverse prospettive, generando aperture e moltiplicando significati. Esse creano legami, reti, relazioni di senso e offrono all'uomo strategie creative e resilienti in grado di generare bellezza attraverso la creazione di spazi condivisi d'azione. Nella relazione pedagogica fra attore e spettatore il teatro si costituisce esperienza *effimera* ma *durevole*, che porta alla trasformazione le parti coinvolte in un *passo di danza armonico* in cui sono coinvolte attenzione, empatia, intenzione, affordances e ambiguità. Nello *spazio potenziale* teatrale, attraverso i meccanismi della simulazione incarnata e della simulazione liberata, i soggetti si rispecchiano reciprocamente, in una comune risonanza. La conoscenza dei processi di attivazione della via cortico-spinale che induce il movimento consente di illuminare il dialogo e offre importanti contributi in ambito educativo e didattico.

Keywords

Performing arts, neuroaesthetics, embodied simulation, affordance, embodied teatrology.

Arti performative, neuroestetica, simulazione incarnata, affordance, embodied teatrology.

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Introduction

Cognitive neuroscience, in close collaboration and dialogue with the Humanities, can foster and promote new knowledge and shed light on various theoretical issues related to theatre art and aesthetics. Different epistemologies mirror each other and reflect from different perspectives, generating openings and multiplying meanings.

The theatrical phenomenon is characterised by a practical, aesthetic and theoretical complexity that makes it difficult to investigate, since it belongs to the dimension of *experience*, elusive in the complexity of the factors that compose it; it is realised in the “*here and now*” and *live*, in the *relationship* between people.

Neuroscience offers a new light on theatrical phenomena, suggesting the creation of a neologism: *embodied theatology* (De Marinis, 2014). The notion aims to investigate the relationship between actor and spectator, and, focusing on individual and reciprocal bodily processes, questions both the way the performer’s body thinks and decides, and the way the spectator (thus, also the researcher) perceives and participates in the performance event (Faletti et al., 2016). The object of study of this contribution is therefore to focus on the actor-spectator *relationship*. This reflection offers an added value to all the training and educational processes that, being *relational* in nature, can be investigated, in the light of the fruitful dialogue, from an original perspective.

Since the discovery of mirror neurons, *embodied cognition* and the definition of *embodied simulation* and *liberated simulation*, neuroscience has offered a new perspective on the phenomena of relationship and intersubjectivity.

In these times, marked by the pandemic, the fragility of the human condition is becoming more evident. Theatre, in fruitful dialogue with pedagogy and neuroscience, can build links, networks, relationships of meaning and offer man creative and resilient strategies that can generate beauty through encounters, relationships and the creation of shared spaces for action.

In the first half of the twentieth century, with the tragic events of the holocaust and wars, faced with the deadly horrors and the *ethos* that considered human beings as worthless, the theatre man rebelled, to make his presence, his acting, his doing beautiful, so that he could say something that few other artists can say: “Come and see me act. [...] Come and see my astonishing beauty, me, a simple human being” (Sofia, 2009). In saying this, he abandoned the fate that had forced him for millennia to be an actor presenting tragic characters, to become a performer who, as an artist and as a human being, seeks to meet other human beings. The statement made by the director-pedagogue Schranz, quoting Grotowski, “the performer is called to be *pontifex*, builder of bridges over the immense voids of the chasms of tragedy, that tragedy which would like the human being to live at a level of life that is enormously below his possibilities” (Sofia, 2009), is true even today. What challenge involves the educator, the teacher, the researcher, and the theatre operator in the times we are currently living? What role do the expressive arts have in the difficult task of meeting distant, wounded and fragile bodies? The dialogue that the human sciences establish with the performing arts and neuroscience can help to trace the path.

1. Towards relationship: *elusive durability of experience*.

In theatre performance, as well as in educational, training and didactic practices and in neuroscientific laboratories, scientific analysis and study cannot exclude the dimension of experience. Reflection then becomes “slippery”, as it emerges the inaccessible and indefinable structure of human *existence*, which reflects the dimension of *uncertainty* and *complexity* that is also inherent in human knowledge (Bocchi & Ceruti, 1985).

The reflection on the actor-spectator relationship, heart and essence of the theatrical discourse, cannot get away from the *irretrievable* nature of the performing action, apparently lost forever despite all the possible documentations and testimonies. At the same time, such circumstances should not prevent its study, since the experience lived by spectators and actors, investigated today by neurosciences, appears to be closely connected to the relationships developed in the educational and training field and can offer a relevant contribution concerning the

simulation mechanisms involved.

In debating one of the dogmas of teatrology from the 1970s onwards, about the ephemeral and insubstantial nature of the theatrical phenomenon, Schechner comes to adopt a *wide-ranging* approach. The decision to extend the theatrical universe to include everyday, non-artistic performance phenomena would, in his opinion, derive from the profoundly *elusive* nature (Schechner, 1999) of this art, which it would be difficult to simplistically define in an object and stop in time. “ Theatre appears either the superior art, the art *par excellence*, crowning a hypothetical hierarchy of all artistic manifestations, or an imperfect, contradictory and irremediably inferior art” (Vicentini, 1988 cited in Schechner, 1999). Unlike many other arts, which change over time, but whose physical presence is substantially preserved, theatre, according to the director, disappears at the very moment it is made, and the object is irremediably absent and elusive. This might be due to the fact that “theatre happens in presence, *hic et nunc*, it is the art of presence, an active and participatory art form, which implies the presence of a living body in relation to other bodies, those of other actors and spectators, who interact at the same time in the same space” (Carlomagno, 2020). Sofia (2013), echoing Cruciani (1991), argues that theatre, despite being usually considered an ephemeral art, is instead *durable* as it “remains in the spectators, in their experience and in their memory. [...] It can condition a behaviour, it can reiterate a choice, it can produce a “change of state” [...]. Experience, in its indissoluble unity of subjective and objective element, is the ultimate goal, the only thing that *remains* of a performance” (Sofia, 2013). Generally speaking, the spectator’s experience, like that of the actor, has always been considered as a variable too intimate to become an object of study. Today, however, studies arising from the collaboration between phenomenologists and neuroscientists, consider the experience as an *emergent system* (Sofia, 2013), inscrutable by direct way, but accessible through the investigation of the levels of which it is composed and the relationships from which it emerges. The emotional states, the experience, the reactions that the spectator can manifest in front of a performance are, in their almost totality, unpredictable; however, unpredictable is not synonymous with random. “Studying the performative experience of the spectator does not mean understanding what the spectator thinks, or feels; rather, it means trying to identify the intersubjective mechanisms that allow the spectator to construct and enjoy it” (Sofia, 2013). But why focus precisely on the actor-spectator *relationship* and not on other dimensions of the theatrical phenomenon? We are assuming the relationship as the object of research, because it is a necessary condition for talking about theatre: “Can theatre exist without costumes and sets? Yes. Can it exist without music commenting on the unfolding of the action? Yes. Can it exist without light effects? Certainly. And without text? Yes; history confirms it. [...] But can theatre exist without actors? I don’t know of any such examples. [...] Can theatre exist without spectators? You need at least one to be able to speak of a performance. And so, all that remains is the actor and the spectator. We can therefore define theatre as *what happens between the spectator and the actor*” (Grotowski, 1968 cited in Sofia, 2013). A further reason for the choice of the focus on the relationship is offered by the reflections arising from the many neuroscientific results found today in the field of intersubjectivity (Ammaniti & Gallese, 2014). Performers and audiences inhabit a physical space, which has traditionally coincided with theatrical institutions. However, during the last century, theatrical subjects left the building designated for the performance, with the intention of favouring *relationships*, and poured into the streets, public spaces, schools, prisons, and places of care and fragility. In Italy, between 1975 and 1983, the Living Theatre had 438 performances in theatres and 148 in the streets or elsewhere; “We need to go to the streets! We need to destroy this architecture that separates people” (Cruciani, 2003). According to Beck, founder of Living, together with Judith Malina, going outdoors represented a need dictated by the necessity of encounter. In addition to inhabiting concrete places, theatre has populated, and continues to do so in the *suspended* time we are living in, the space of fantasy and imagination, creativity, stories and poetry. Barba defines it as a “place of the possible” (Oliva, 2008) and this precious empty space, to be inhabited as a possible, thinkable, imaginable opportunity, allows us to expand the concrete and relational dimension, expanding it beyond the

boundaries of reality, to the realm of fantasy, of play, where space and time are lifted, anchored to the dream, in a magic circle or oasis, a frame of meaning that legitimises artistic expression. According to Clelia Faletti, theatre is also present, in an equally tangible form, in the *area of action we share*, which is neither metaphorical nor mental, but real, measurable, inside the brain, an area of a few square millimetres that corresponds to the same area as the other people we meet. When an actor on stage performs an action (motivated, goal-directed, intentional), neurons in a certain area of his brain are activated and the same activity occurs in the same area as the person sitting opposite him and observing him. “This dance, in the theatre (which is the place par excellence of gazes), the spectator in the stalls is doing it together with the actor on the stage and together they are creating a shared dynamic space of action which, at the same time, is a *dance*, or *peripeteia*, of intentions” (Sofia, 2009). Not surprisingly, the same metaphor has been used to indicate the pedagogical bond, a relational dance step between *minus* and *magis*, in an asymmetry that produces change (Bertagna, 2018).

Thanks to the pedagogical perspective, we can interweave different scientific registers, focusing on the uniqueness and unrepeatability of the experience of actors and spectators who are involved in a mobile creative dance in *being*, holding as goal of its “*ought to be*” harmony itself.

Roberta Carreri, an actress from Odin Teatret, also defines the work of the actor as a “*dance of intentions*” (Carreri, 2007 cited in Sofia, 2013). Pedagogy, binding together past, present and future, offers the posture of Klee’s Angel Novus taken up by Benjamin (Bertagna, 2010): the celestial creature seems in the act of moving away from something on which it fixes its gaze, it advances into the present that comes towards it and walks looking at the road already travelled. This perspective leads us not to crystallise or X-ray the theatrical event, closing it in time and space, but to welcome the experience, even the theatrical one, as a non-stop flowing between past, present, welcoming the future coming towards it, because as “every human experience of reality is always unique and unrepeatable, singular, intransmissible, since every human self is infinite, in the perennial opening to the instant that is coming, imperfect adventure” (Bertagna, 2018).

2. The embodied relationship: I simulate therefore I am.

The historical path that the science of acting has intertwined with the human sciences can be summarised as the transition from *cogito ergo sum* to *sentio ergo sum* to *simulo ergo sumus* (Sofia, 2009). Neuroscience has revolutionised the notions of perception and imagination, revealing the close relationship between action, perception and cognition (Testa & Caurana, 2021). The Cartesian cognitivist paradigm of positivism found in the “*Cogito ergo sum*” is said to have been replaced by one that focuses on feeling and expressing, which can be defined as *sentio ergo sum*, characterised by Darwin’s scientific contributions (Darwin, 1985). We are now witnessing the emergence of *simulo ergo sum*, a modern paradigm inaugurated by the discoveries on the mirror neuron system by Rizzolatti (Rizzolatti & Gnoli 2016, Rizzolatti & Sinigaglia 2019, Rizzolatti & Sinigaglia, 2006, Rizzolatti & Voza, 2008), Iacoboni (2008) and other researchers of the Department of Neuroscience in Parma in the 1990s, including Gallese, who describes *embodied simulation* as a basic functional mechanism, thanks to which our brain would reuse part of the neural resources of interaction with the world, modelling relations and relationships and making them available to perception and imagination (Gallese & Guerra, 2015). Thanks to this discovery and subsequent contributions, we can investigate the social and relational dimension from a new point of view, capable of suggesting reflections that open our eyes to phenomena that have been studied for some time. The team launched an intense and fruitful research activity that in the last thirty years continues to offer numerous results on an international scale. Already in the reflections of many researchers, among them Damasio (1995), Berthoz (2015, 2011, 1998), Gardner (1987), Goleman (2011), LeDoux (1998), Edelman (1993), Galimberti, (1998) we can trace the foundations of these discoveries, as well as in the paradigm of Maurice Merleau-Ponty, in which we identify the first stages of thinking about *embodied cognition*. He stated in 1945: “The body is the origin of all expressive spaces. The

body of movement and expressive gesture that reaches out to the world reveals both the perceiving subject and the perceived world. [...] Whether it is someone else's body or my own body, I have only one way of knowing the human body: to experience it, that is, to embrace the drama that runs through it and to merge with it. I am therefore my body, at least to the extent that I have an experience" (Merleau-Ponty, 1945). Body, movement, experience, action and cognition are all interconnected and actors in a process characterised by complexity, in which *simplex* forms (Berthoz, 2011) of interaction with the world are structured. Our ability to understand the actions of others and the motor intentions that generated them, and the emotions and sensations felt by our fellow human beings, is not based exclusively on cognitive strategies involving the application of sophisticated logical-deductive processes, but rather on *embodied simulation* and various mirroring mechanisms of which mirror neurons form the neural basis. This evidence suggests that our ability to enter the world of others' experiences, attributing a mutually shared meaning to those same experiences, is the result of the activation of these systems and thanks to them we are allowed to understand the other directly and *from within*. Inter-individual resonance constitutes an innate dimension of our being human and it becomes crucial also for interpreting art, creativity and the aesthetic dimension of human existence (Gallese, 2010). Peter Brook, claiming that with the discovery of mirror neurons scientists had begun to understand what theatre has always known, maintained that the actor shares, beyond any language or cultural barrier, the sounds and movements of his body with the spectators, making them part of an event that they themselves must contribute to creating (Rizzolatti & Sinigaglia, 2006). Actor and spectator mirror each other, in an upward spiral that leads each of the two parties towards a change, given by the resonance that takes place. Rizzolatti states that every time we see someone perform an act our motor system *resonates* (Rizzolatti & Sinigaglia, 2006 cited in Sofia, 2009). The mirror mechanism is involved in the imitation of simple movements, in learning by imitation complex skills, such as learning to play the guitar, or to dance capoeira (Rizzolatti & Sinigaglia, 2006). Infants are congenitally ready to connect with their caregivers through the imitation of buccal gestures, such as protruding the tongue or opening the mouth (Meltzoff, 2007). Besides empathy, some interesting phenomena described by social psychologists could also receive a neurophysiological explanation in the light of the mirror mechanism, including the *chameleon effect*, i.e., the tendency of observers to unconsciously mimic the expressions and postures of their social partners (Chartrand & Bargh, 1999), or *emotional contagion* (Hatfield et al, 1997), i.e. the tendency to imitate and automatically synchronise with the facial, vocal, postural and gestural expressions of another person and, therefore, to converge emotionally. The activity of neural and sensorimotor and affective systems simplifies and automates the behavioural responses that living organisms produce to survive in their social environment. The perception and production of facial expressions with emotional meaning might involve common neural structures, with functions hypothetically similar to those of the mirror mechanism. "Both observation and imitation of facial expression of basic emotions activate the same narrow set of brain structures, including the ventral premotor cortex, the insula and the amygdala" (Ammaniti & Gallese, 2014). In the second half of the twentieth century, thanks mainly to the experiments of the New Theatre (Living Theatre, Grotowski, Brook, Odin Teatret, Open Theatre etc.), on the one hand, and, on the other, thanks to the acquisitions of human sciences, including semiotics, and neuroscience, a series of important international initiatives have developed in the last four decades, which have contributed to the growth of discussion and research on the biological bases of performing arts. Heterogeneous experiences have led to a wide-ranging reflection, which allows to extend the field of investigation of theatre research by highlighting the complexity and vulnerability of performing arts (Bortoletti, 2007). These considerations have been fertile ground for the reflections developed in the last fifteen years on the Italian scene, including the five editions of the International Conference "Dialogues between theatre and neurosciences" (Rome, 2009-2013), in which explorations of the contact territories between theatre and neurosciences can be found, in particular those "pre-interpretative reactions" of the spectator which began to be discussed in the 1980s within the ISTA, International School of Theatre Anthropology and theatrical an-

thropology studies, and which were, perhaps, all too soon set aside. The discovery of the mirror mechanism also provided a neuroscientific basis for interpreting the growing evidence of the role of experience-based motor knowledge in modulating the ontogenetic development of intersubjectivity. Such investigations, deriving from developmental psychology, project us into the sectoral area related to the workshop of Theatre Education (Oliva, 2017), as a specific pedagogical modality, which can also be extended to school education, that allows to experience the performing arts in the first person, as a tool that can develop creativity, foster socialization, achieve meaningful learning based on lived experience.

3. Dilated intention

From the neuroscientific perspective, the actor in theatre not only plays a part but also has the possibility and responsibility to trigger great psychophysical forces in the spectator. In order to keep the spectator's interest alive, the actor must know how to direct his attention, as if it were a "*cognitive picklock*" (Sofia, 2013). The theme of intentions constitutes a link between neuroscience and theatre since, by exploring the concept of *vitality forms* (Stern, 2011) and *subtext* (Stanislavsky, 1996), we can observe how stage actions are always characterised by precise intentions, which can be clearly manifested with an explicit verbalisation, or, in most cases, are implicitly understood in the subtext that says the intention, the emotion, the will, the *life line* of the character, what he thinks or feels; It involves body language, the intensity of the gaze, the eyes, the intonation of the voice and pauses.

Daniel Stern, whom Rizzolatti's team worked with, called *vital forms* (Stern, 2011) the aspects that characterise the dynamics of an action or an emotional reaction and which often lead us to say that a handshake is *energetic*, a caress is *delicate*, an outburst of anger is *violent* or a smile is *subtle* (Rizzolatti & Sinigaglia, 2019). Galimberti already recalled that "in the violence of my gesture or in its delicacy, in its decisive or uncertain tone, there is my whole biography, the quality of my relationship with the world, my way of offering myself" (1998). *Vitality forms* are "the experience of a force in motion, with a certain temporal profile and a certain sense of vitality and directionality" (Rizzolatti & Gnoli, 2016) and argue that from how an action is performed, whether gently or abruptly, the observer can understand what relationship there exists between the agent of the action and the person towards whom the action is directed, considering five properties of movement: time, space, force, trajectory and direction.

In the study of behaviour during performances, the concept of stage presence is well known, which Barba describes as the actor's *strength*, acquired through many years of experience and work, that *kernel of energy*, like an evocative and skilful irradiation, but not premeditated, which captures the spectator's senses and forces him to direct his attention towards a specific actor (Barba & Savarese, 2005). We are not alive and credible, in everyday life, when we act knowing we are being observed: the gazes of others pin us down, we feel blocked. The art of the actors consists in giving life to this situation, normally dead, of *acting exposed*, of showing oneself, of being watched, dilating the intention in order to strengthen one's own scenic presence; this is achieved through intentional acting. "Performing the action is, at one and the same time, stimulating the spectator: a double necessity, a double objective that changes the nature of every scenic intention. We could perhaps call it a *dilated intention*, dilated because it is directed both towards the scenic action and, in some way, towards the spectator" (Sofia, 2013).

Neuroscientific studies have suggested that in humans the mechanism of motor mirroring may also underlie the understanding of motor intentions behind the actions of others. The premotor areas of human brain with characteristic properties of mirror neurons (i.e., areas that are activated both during the execution and observation of a motor act) are also involved in understanding the *reason* for action, i.e., the motor intention that promoted it, probably using a neurophysiological mechanism is not dissimilar to that discovered in the parietal and premotor mirror neurons of the monkey (Iacoboni et al. 2005 cited in Gallese, 2010). A specific category of mirror cells plays an essential role in the encoding, not so much as regards the action observed, but above all in encoding the intention associated with it, an intention that is carried out

through a sequence of simpler actions such as reaching for the cup, grasping it, bringing it to the mouth, and then drinking from it. The basic property of mirror neurons, i.e. their activation both by the act of grasping a cup and by an equivalent act of grasping that is only observed, suggests that these cells contribute to the recognition of actions performed by other people. The notion of *affordance* introduced by James J. Gibson (Rizzolatti & Sinigaglia, 2006) refers to the practical opportunities that the object offers to the organism that perceives it. In theatre, the actor's work is characterised by a real *deflagration of affordances* for the creation of new ones. On the stage, the everyday world explodes in different potentialities, and surprises the spectator, fascinates him, provokes him, frightens him and attracts him, just because it is unexpected. The actor works by creating *affordances* and leaving the spectator in a fluctuation of foreseen and unforeseen co-constructions; Barba defined it "*potential space*": "in my opinion, the effectiveness of a scenic space lays in its capacity to arouse in the spectator a double perception: it was a recognisable space and, at the same time, a *potential space*, ready to strip itself of its identity to be transformed by the forces of the performance. It was an emptied space, not a space with no interior, unadorned and mute. It admitted to be what it was, and determined to deny itself. I was working to empty and fill the space, to affirm the theatre and refute it, to construct conventions, bonds and separations and to undo them" (Barba, 2009). Theatrical actions are constructed amidst contradictions and paradoxes, oscillating between fiction and reality, creation and destruction, proximity and distance; the concept of *affordance* thus appears to be closely linked to that of *ambiguity*, which has been thoroughly investigated by the neuroscientist Samir Zeki (Sofia, 2013). The actor pushes the spectator towards a continuous *instability*, a continuous experiential disequilibrium in which ambiguity is constituted as the gap, the discrepancy, between what the spectator expects, expects and what the actor *can* do. An ambiguity that mobilises, does not paralyse, opens the relationship to a multiplicity of possibilities and this is a fundamental characteristic of theatre. As Peter Brook points out: "once the performer is connected with the audience, the event can go in many directions" (Brook, 2005 cited in Sofia, 2013). A dance of intentions is then created, a harmonic resonance between the actor's actions and the audience's reactions, which become dialogue in the reciprocity created between the parties.

4. Neuroaesthetics

In recent decades, cognitive neuroscience has extended its field of investigation to the domain of artistic creation, the term used to define this approach is "*neuroaesthetics*" (Gallese, 2010). Seeing a work of art or attending a theatrical performance involves not only vision, hearing and the canonical senses, but also the motor system, the somato-sensory system and the circuits that govern our ability to feel emotions. Gallese proposes an approach that seeks to address aesthetic experience from the perspective of *embodied simulation*; looking is conceived as an active, multifaceted process in which the so-called *external world* implies the relational pragmatic inherence of the observer. "Looking at the world implies a multimodal notion of seeing, in which senses such as touch also participate and which involves the emotional sphere, all guided by the fundamental pragmatic nature of the intentional relation. This is even more true, if possible, when the object of our intentional relationship is the art object" (Gallese, 2010). The hypothesis holds that a painting, a sculpture, and therefore also a play, derive a substantial part of their aesthetic connotation precisely because of the type of embodied emotional resonance, the simulation of actions, sensations and emotions that they evoke in us. In 1956, the psychiatrist Fremont-Smith, presenting to the group coordinated by Gregory Bateson, traced his interest in group phenomena back to the moment when, at school, he noticed that "all the legs of the people present went up in the air and came down again", without anyone noticing, during a student's attempts to beat the school record in high jumping (Bateson, 1996). Umiltà and colleagues (Umiltà et al., 2012) tested how the observation of high-resolution static images of abstract paintings, such as Lucio Fontana's famous cuts, could be associated with a specific cortical motor activation in the viewer's brain. The results clearly show the involvement of the cortical motor system in the viewing of static abstract artworks. The mimetic enjoyment of

the artwork is therefore a component of the aesthetic experience and represents its basic level (Freedberg & Gallese, 2007).

For what concerns dance as well, mimetic mechanisms are probably crucial since, thanks to movement and rhythm, the two aspects that delimit our horizon coexist: space and time. “The rhythmic scansion and the topology of the action are *artistically* expressed in a dimension that frees the expressive instrument, the whole body, from the usual and everyday utilitarian finalism. In dance, the purpose of the action is the action, an action that already at the purely motor level of description is, however, full of meanings for those who perform it and those who observe it” (Gallese, 2010).

The German philosopher Robert Vischer (1873) exerted an enormous influence on the aesthetic debate by distinguishing the mere perceptual process of seeing from the pragmatically active process of looking. “According to Vischer, the aesthetic enjoyment of images, in general, and of works of art, in particular, implies an empathic involvement that takes the form of a whole series of physical reactions in the observer’s body. Particular forms observed would arouse reactive emotions, depending on their conformity to the design and function of the body muscles” (Gallese, 2010). Oftentimes, our enjoyment of works of art is configured as the experience of *sighted non-viewers*. If we expand this existential and sensory posture also in the relational sphere, we observe how theatre, which builds its techniques on presence, on being, on the density that the body occupies in space and on the intentional physical action that takes place in the here and now, makes the experience of being *non-sighted viewers* possible; in other words, it allows us to rediscover new ways of seeing, it makes it possible to rediscover new senses, including listening and touching, and to descend deeply into human experience and existence by making active, bodily, concrete, dynamic experience of the world and knowledge, thus declassifying *seeing*, which is so abused and overrated today.

According to Gallese, theatre is the universal expression of an essential characteristic of human existence, recognized by René Girard in the *mimetic desire* (Girard, 2006 cited in Gallese, 2009). The theatre would be a ritualized and metaphorical expression of the conflictuality of the human condition and would allow this violence to be exorcised through its representation. Comedy and tragedy have a common mimetic scheme, “laughter and weeping share the same propensity to bring the body into play in order to expel, to cathartically remove from itself the conflicting mimetic scheme at the heart of both comic and tragic theatre” (Gallese, 2009). Not coincidentally, laughter is best evoked by tickling, a bodily practice that simulates an attack on the other person’s body and, as a matter of fact, is difficult to reproduce on one’s own body. Comedy thus becomes an intellectual tickle that puts us in the position of witnessing the eternal conflictual reciprocity of our species, ritualised in the mimetic scheme intrinsic to the comic genre. The stage, where conflict is staged, is conveniently kept at a safe distance from the spectator, who only enjoys himself to the extent that he feels safe from the *mimetic contagion* (Gallese, 2007). By means of the discard produced by artistic creation, man is forced to suspend his grip on the world, releasing hitherto unavailable energies, placing them at the service of a new ontology that can finally, perhaps, reveal who he is. Rather than a suspension of disbelief, the aesthetic experience aroused by artistic production can be interpreted as a “*liberated simulation*” (Gallese, 2010). Why does a film or a play potentially move us more than a real-life scene of which we can similarly be spectators? Perhaps because in artistic *fiction* our connection to the narrated action is totally free from direct personal involvement as Bateson (1977) points out among the examples of *context-signalling* situations. “Some examples are the handshake of the boxers before the fight which indicates that it is true that they will fight, but they will do so in a *sporting* way; or the frame of the stage which indicates that it is true that the people moving in that context will get married, divorced, go berserk and so on, but they are *only acting*” (Sclavi, 2003). We are free to hate, love, feel terror, doing it from a safe distance. This makes mimesis a *cathartic act* and can bring our natural openness to the world into play in a more all-encompassing way. “Enjoying art, after all, means getting rid of the world in order to find it more fully. If we try to read this assumption from a neuroscientific point of view, an

experimentally verifiable hypothesis follows. The intensity of the mechanisms of resonance and simulation, with the same attentional focus, should be greater when the experience of the image has artistic connotations” (Gallese, 2010). We therefore wish to explore the heuristic potential of the performing arts with the conviction that the neuroscientific approach allows for a further enhancement of the extraordinary dimension of art and aesthetic experience.

Conclusions

Neuroscience offers a new perspective in the study of the performing arts; in close collaboration and dialogue with the humanities, it can foster and promote knowledge and shed new light on various issues related to theatre art and aesthetics. The processes involved in the artistic and expressive domain can be investigated from a perspective that maintains a close interrelation between body and mind, namely *embodied simulation*. Thanks to the knowledge of the mechanisms of mirroring that take place in the relationships between actor and spectator, we can build a wide-ranging reflection, considering the complexity and fragility of the performing arts as an opportunity to investigate the multiform dimensions of human expression.

We would like to hope that we can continue a reflection on the role of empathy and imitation and on possible transformations at stake in the current fragile period, which, from many sides, are asking the theatre to offer new answers, and are generating new questions, regarding its object of study, the social and bodily practices involved, the phenomena and processes involving the body and movement.

We can therefore affirm that, through the mechanisms of embodied simulation and liberated simulation, and thanks to the knowledge of the activation processes of the cortico-spinal pathway that induce movement and the expression of emotions, the performing arts can significantly contribute to the development of an intersubjectivity, specifically the relationship of the subjects involved in the performing practices, actor and spectator, developing the capacity to recognise the other as different from oneself.

This perspective, which amidst lights and shadows is provided by the fertile dialogue, allows us to investigate theatrical subjects from a new point of view, in order to welcome the current wound of fragility as a loophole. It is precisely by returning to the initial metaphor of epistemological paradigms, which like mirrors placed in front of each other show their image endlessly repeated, that we can foresee openings, multiple and unexplored horizons that question interdisciplinary studies and project them towards a dialoguing transdisciplinarity.

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