

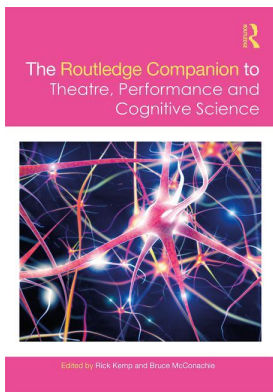
This article was downloaded by: 10.3.98.93

On: 16 Jan 2019

Access details: *subscription number*

Publisher: *Routledge*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London SW1P 1WG, UK



The Routledge Companion to Theatre, Performance, and Cognitive Science

Rick Kemp, Bruce McConachie

Systems Theory, Enaction and Performing Arts

Publication details

<https://www.routledgehandbooks.com/doi/10.4324/9781315169927-21>

Gabriele Sofia

Published online on: 05 Sep 2018

How to cite :- Gabriele Sofia. 05 Sep 2018, *Systems Theory, Enaction and Performing Arts from: The Routledge Companion to Theatre, Performance, and Cognitive Science* Routledge

Accessed on: 16 Jan 2019

<https://www.routledgehandbooks.com/doi/10.4324/9781315169927-21>

PLEASE SCROLL DOWN FOR DOCUMENT

Full terms and conditions of use: <https://www.routledgehandbooks.com/legal-notices/terms>

This Document PDF may be used for research, teaching and private study purposes. Any substantial or systematic reproductions, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The publisher shall not be liable for an loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

SYSTEMS THEORY, ENACTION AND PERFORMING ARTS

Gabriele Sofia

The revolution of systems theory

Systems theory has undoubtedly been one of the most revolutionary turning points of epistemology in the twentieth century. We could hardly find a field of studies that has not been influenced by this theory. Its paradigms have affected several research areas, from biology to philosophy, from sociology to theatre cultures.

One of the insights that has promoted such a *paradigm shift* is the awareness that, in order to analyse living systems, we cannot merely describe their single components, but have to consider how they interact with each other. Adopting a well-known expression, the 'whole is greater than the sum of its parts.' The added value is due to their organisation. One of the first scientific fields to embrace this paradigm was the biological sciences. On the basis of the understanding that anatomy itself was not sufficient for a description of organisms, the biologist Ludwig von Bertalanffy, founder of the *General System Theory*, stated:

Since the fundamental character of the living thing is its organization, the customary investigation of the single parts and processes cannot provide a complete explanation of the vital phenomena. This investigation gives us no information about the coordination of parts and processes.¹

(Von Bertalanffy 1972, 410)

The epistemological consequences of such considerations caused a deep questioning of the processes of knowledge organisation in Western cultures. Edgar Morin tried to synthesise it, by comparing the paradigm of 'simplification' with that of 'complexity':

The paradigm of simplification is based on the separation of the different areas of knowledge; in this sense, the objects of knowledge are separated from their context. Therefore, we think that we 'know,' when we isolate the object. The first aspect of simplification is separation, the second is reduction: the knowledge of a set of elements of a whole is reduced to the knowledge of each of its single parts, without considering

that there are qualities of the whole which cannot be detected when each of its parts is analysed singly. On the contrary, the paradigm of complexity consists in maintaining the interdependency between objects: we observe all of them, but maintain them as united.

(Morin 2002, 25)

One of the most important innovations in this sense has been the central role played by the notion of *environment*. For hundreds of years the cultural hegemony of scientific objectivity has imposed the experimental practice of isolating the analysed phenomenon from the physical, environmental, cultural context within which it naturally takes place. In contrast, systems sciences have highlighted the connection between the different elements and therefore reintroduced the study of the relations to which a phenomenon gives rise within its environment. 'Complex' stems from the Latin root *cum-plexus*, 'to weave with.'

One of the most important consequences of this approach, which have sometimes been defined as *ecological*, is the focus on the inevitable influence of the observer on the phenomenon, with which he shares the same environment. The research on quantum physics provided impressive examples.² In this account, there can be no presumption of purely objective measurements, which are considered as resulting from the relationships among the observed phenomenon, the observer, the adopted tools and the environment in which the observation takes place. In other words, the scientific world has been forced to overcome the distinction between subject and object that had been fundamental in the past.

Theatre cultures have been widely affected by this revolution. In the 70s, Grotowski had already proposed the following definition of theatre: 'We can thus define the theatre as what takes place between spectator and actor. All the other things are supplementary' (Grotowski 1968, 32). With these words, Grotowski introduced a systemic logic into the study of the theatrical event, which is no longer considered as an *object*, but as a constantly developing *relationship*, that *takes place* between (at a minimum) two human beings.³ By his mere presence, the spectator is therefore a co-creator of the theatre event. The actor-audience relationship is no longer characterised by a unidirectional logic, but rather by a circular system of stimulations.

Undoubtedly a great contribution to the spread of systems theories within the performing arts has been those new theories that propose patterns of cognition no longer isolated in an individual's brain, but embodied and located within an environment. The model that has probably facilitated the most complete synthesis of these principles is the *enaction* model, proposed by Francisco Varela in the late 80s.

Enaction: a new model of human cognition

The notion of enaction is the result of a long process of research and reflection that Francisco Varela had carried out since his youth, when he started to collaborate with his mentor Humberto Maturana. In fact, this notion is based on what the two scientists defined as *autopoiesis*, which is a life system's capacity for self-production through constant interaction with its environment, despite the ongoing changes of its components (Varela, Maturana, and Uribe 1974; Maturana and Varela 1973, 1984). The notion of *autopoiesis* permitted the definition of a living system not through its elements but through its dynamical organisation. In this sense, the ontology of a living system is not determined by what it *has got*, but by what it *does*,

by its way of interaction and self-organisation. Therefore, *action* plays a central ontological role that, once applied to the cognitive sciences, led Varela and his colleagues to propose a radically new model:

Since this analytical perspective is specifically interested in highlighting the notion of action with respect to that of representation, it is suitable to name this new approach of cognitive sciences *enaction*.

(Varela 1989, 93)

In fact, enaction opposes representational models, on which almost all the studies of the cognitive sciences had so far been based. The representational models described the relationship of the human being to its environment, according to a logic based on a strict distinction of inner and outer. Initially, the so-called ‘cognitivist’ models stated that the brain produced ‘inner’ symbolical representations of the ‘outer’ world and that they had to be deciphered through cognitive operations. These models were then replaced by the so-called ‘emergentist’ ones, which proposed that the world cannot be experienced directly but only through emerging representations that the brain *projects* onto the environment.

As an alternative to these perspectives, the enaction model was not based on representations but on *embodied action*:

These two extremes both take representation as their central notion: in the first case representation is used to recover what is outer; in the second case it is used to project what is inner. Our intention is to bypass entirely this logical geography of inner versus outer by studying cognition not as recovery or projection but as embodied action.

(Varela, Thompson, and Rosch 1991, 172)

The latter is then defined according to two characteristics:

By using the term embodied we mean to highlight two points: first, that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context. By using the term action we mean to emphasize once again that sensory and motor processes, perception and action, are fundamentally inseparable in lived cognition.

(Varela, Thompson, and Rosch 1991, 172–3)

Underlying the impossibility of separating the perceptive from the motor processes (the same will be confirmed at a physiological level by the studies on the mirror neuron mechanism, cf. Rizzolatti and Sinigaglia 2006), the enaction model based cognition on the circular relationship between human beings and their environment. This understanding can be synthesised in the following few lines. Each time we ‘perceive’ the world, we are actually *acting* upon it, and it upon us. In other words, we are modifying the object that we intend to perceive. If every perceptive act modifies the very object of perception, then there is no pre-determined world that can be perceived ‘as it is.’ Instead, the world itself is established and modified by the individual who perceives it. What we refer to as ‘perception’ is not a passive process, it is not data collection, but it is the result of a circular interaction between the individual and the world.

Situating performance

As I have already said, the performing arts have been influenced by enaction theories, both directly and indirectly.⁴ However, this influence has often been limited to the adoption of some successful key words (*embodied mind*, *autopoiesis*, etc.), without embracing the full paradigm shift required by enaction theories. For example, many analyses continue to employ a representational logic, or a strict dichotomy between inner and outer is often maintained.

Moreover, most scholarship in the performing arts continues to operate according to the paradigm of simplification, proposing a separation of diverse genres (dance, theatre, circus, etc.), competencies (lighting design, dramaturgy, scenography, etc.), steps of production (training, rehearsals, performance, etc.), components (text, acting, direction, etc.) and even the phenomenon itself (performance vs. reception). In other words, performance has often been considered as an *object* rather than as a constantly changing and dynamic *relationship*. If at a certain level of the work such a method of analysis can appear functional, it is because one does not analyse the interactions and the organisation of the examined elements.

Precisely as occurs in systems sciences or enaction theories, the first step to subvert this trend is the act of situating the performance event within its environment. If studies on reception have often focused on the way the spectator perceives the performance, the opposite influence has often been neglected. A strict systemic approach forces us to imagine how the mere presence of the spectator affects – or better, interferes with – the performer's cognitive organisation. Doing this, we become aware of two remarkable *interferences*:

- 1 The former concerns the organisation of the performer's action. If an actor has to drink from a glass on the stage, every motor act he is going to activate ('grabbing the glass,' 'bringing the glass to his mouth,' 'swallowing the water,' 'putting the glass again on the table') will be aimed at performing the act of 'drinking a glass of water.' but, though the action is factually the same and follows *the same series of motor acts* and is performed *in the same time*, it will be different, since the actor is here supposed to stimulate the spectator's attention. The actor's action is not only directed to an on-stage aim (drinking the glass of water) but also to the audience (stimulating the spectators' attention). The same action has two different aims. This gives rise to a 'double intention' of the actor or rather to a *dilated intention* that broadens from the performed action out to the audience. We can reasonably suppose that such a 'broadening' of the intention concerns a peculiar neuro-motor dimension.
- 2 The latter concerns the planning of actions. The spectator is not merely someone who is present in that particular moment; he is rather someone who 'expects' something from the performer. The Latin etymology of the word 'spectator' is *spectare*, which is the same stem of the Italian word *aspettare* (expecting/waiting for). In this sense, the spectator's aim is always to anticipate, with more or less consciousness, the actions that will take place on the stage.⁵ On the other side, the effect of spontaneity of the actor is based on the ability of performing every action, albeit usually planned and rehearsed, as if it took place there for the very first time, without making any unconscious anticipations. Let's take an example. Let's think about something on the stage that is supposed to appear as 'unpredictable' for the spectator, like the sound of someone knocking at the door. If this moment is incoherent because the actor knows exactly when that would happen and moves towards the door before the sound, the spectator can anticipate the knock and the scene is unbelievable. This means that the actor needs to modify his daily and

natural tendency to anticipate the sequence of his actions and rebuild it with a different awareness of his stage behaviour.

This example shows the difference between the everyday and the on-stage action and allows us to remark that, considered in neurophysiological terms, this difference is probably quite significant, since it may concern the processes of action planning, postural control, decision-making, body schema and so on. On stage, through specific training, the human being has then to develop neuromotor dynamics different from those adopted in his everyday life. The great exponents of the theatre of the twentieth century defined this alternative organisation of the performer's thought-action in different ways: as second nature (Stanislavski), as achieved spontaneity (Copeau), as biomechanical (Meyerhold), as Über-marionnette (Craig), as an actor's extra-daily techniques (Barba) and so forth. If we analyse how the pedagogical practices of these directors operate on the actor's organism, we find several correspondences. Despite the aesthetic differences between one director and the other, most of the exercises that they proposed operate on mechanisms related to the *body schema*. The studies concerning the notion of body schema teach us that our body-mind system involves widely dispersed operations that cannot be traced back to a 'mechanism of central control' that combines information concerning the outer environment, the position of the actor's body in space, his posture and his possibility of interacting. Some research suggests that actors may develop some deep modification in their body schema dynamics, acquiring what I have elsewhere defined as a *performative body schema* (Sofia 2013a, 2013c; Lippi et al. 2016). That could give to the actor a different awareness of his stage behaviour. Moreover, a *performative body schema* would permit the actor to develop new motor routines that allow for the *dilated intention* I have mentioned before.

Co-constitution and intersubjectivity

In the last years of his life, Francisco Varela underlined how the enactive paradigm could provide a new methodology to approach the study of human consciousness. Varela looked for evidence as to how each subjective experience is connected to the experience of the others:

Experience is clearly a personal event, but that does not mean it is *private*, in the sense of some kind of isolated subject that is parachuted down onto a pre-given objective world.... An investigation of the structure of human experience inevitably induces a shift to considering the several levels on which my consciousness is inextricably linked to those of others and the phenomenal world in an empathic mesh.

(Varela 1996, 340)

Questioning the actor-spectator 'empathic mesh' could be one of the key problems of a systemic approach to the performing arts. If an investigation of human experience is possible, the study of human experience when involved in an actor-spectator relationship should be possible as well.⁶ Recent studies on intersubjectivity are essential in order to approach this problem. Alain Berthoz and Jean Luc Petit (2008) proposed the notion of *co-constitution*. This notion updates what Edmond Husserl (1973) defined as *Mitkonstitution* and recalls enaction theory, according to which there is no 'pre-determined' world, because the world itself is constituted, modified and perceived by the subject through a circular process of perception-action. Thus, the world is not separated from the subject, but rather composes

the latter; it is part of him. In this perspective, two interacting subjects do not ‘share’ a same pre-determined world but actively co-constitute it. The world perceived as ‘already constituted’ is an effect due to the fact that the subject has always been experiencing a context shared with other subjects, who interact with the world through the same motor routines of the subject. This is how we can realise that my way of perceiving the world depends on the way in which the other subjects interact with me, co-constituting the world. More recently, some research (Costantini et al. 2011; Fini et al. 2015; Committeri and Fini 2016) has re-proposed this paradigm, highlighting some important aspects. The perception of an object does not depend only on my potential action on the object, but also on the potential action of the other individuals who, being present within my field of vision, might interact with the same object. We do not simulate only our interaction with space, but also those with whom we *co-constitute* the space. Let us suppose that I am a spectator and that the individual with whom I co-constitute space is an actor. The actor would inhabit the co-constituted space according to neuromotor routines *different* from the usual ones: he would actually adopt a *performative body schema*. His extra-daily motor techniques would also make my simulation of his potential actions extra-daily. Moreover, in this way, the perception of the space that I, as spectator, have co-constituted with the actor, changes radically and provides me with an extra-daily experience of the environment. My experience would then acquire different and unique *structure* not only with respect to all the other daily experiences, but also with respect to all the other spectator’s experiences that do not entail a co-constitution of space with another human being (cinema, TV, internet, etc.). This could be, therefore, one of the fundamental phenomenological characteristics of the *performative* experience of the spectator in a theatre.

From the phenomenological level to the sense-making process

What we have discussed up to now could give us a new way of thinking about the motor-cognitive dimension of the actor-spectator relationship. At a first glance, this seems really far from the spectator’s activity of making sense of the performance, and it probably is. But one of the most important insights of systems theory has been to make complex the notion of biological organisation, which reveals how direct and quick the perturbation between one level and another could be, despite their distance. Human motor behaviour is actually strongly connected to the process of making sense throughout the assemblage of motor schemas.

For example, in a particular situation, a person has to recognize many things – the people sitting around the room, the furniture in the room, the location of a particular object the person is looking for – and this means that one has different schemas for recognizing the object, the furniture, and the people. Furthermore, such schemas may have to be combined in order to represent a totally novel situation. One thus calls upon the appropriate knowledge for making sense of that situation. I call this schema assemblage. At any particular time there is a network of interacting schemas pulled together to represent the situation.

(Arbib and Gallagher 2004, 54–5)

Making a precise description of all the layers engaged in the spectator’s experience is clearly impossible, but it is important to understand that the motor-cognitive layer is always in resonance with all the layers of the experience (emotional, cultural, biographical, etc.) above

it. We could actually envision that the performative event engages the spectator in an ongoing reassembly of his schemas, giving birth to new meanings and new performative experiences.

The more we refine our theoretical tools, the more an exhaustive description of the spectator's experience becomes difficult. This puzzle doesn't make the systemic or enactive approach useless. The aim is not actually the quest for an answer to this 'hard problem' but the radical change of the epistemological platform we use to deal with it.

Notes

- 1 I discovered this quote, thanks to the PhD thesis of Victor Jacono (2012), who remains one of the researchers who have consistently questioned the relationship between complexity sciences and theatre acting pedagogy (cf. also Jacono 2009, 2014 and 2016).
- 2 On the epistemological consequences of quantum physics on humanities, there is an excellent essay by one of the founders of subatomic physics, Niels Bohr (1937).
- 3 We have to remember that Grotowski was knowledgeable in quantum physics. He had often defined the institute of Niels Bohr as a great inspiration for his laboratory theatre. A quite useful essay on the scientific influences on Grotowski's work is that by Jean Marie Pradier (2013).
- 4 For example, in the 90s, Humberto Maturana wrote a dialogue-book along with Susana Bloch, neurophysiologist and theatre theoretician, founder of the *Alba Emoting* method (Maturana and Bloch, 1996). In contrast, Francisco Varela, despite his close contact with the milieu of theatre (his wife was a dancer, while his daughter Leonor is a famous actress), gave only one interview on cognitive sciences and performative arts to Maria Leao for her PhD thesis (2002).
- 5 For more considerations of the spectator's tendency to anticipate the performer's actions in a pre-reflective way, cf Sofia (2013a, 2013b).
- 6 With this aim some reflection on 'embodied theatology' (Cf. De Marinis 2016, Sofia 2016).

Bibliography

- Arbib, Michael A. and Shaun Gallagher. 2004. "The minds, machines, and brains of a passionate scientist: An interview with Michael Arbib." *Journal of Consciousness Studies* 11(12): 50–67.
- Berthoz, Alain and Jean-Luc Petit. 2008. *The physiology and phenomenology of action*. Oxford University Press. [Original version: 2006. *Phénoménologie et physiologie de l'action*. Paris: Odile Jacob].
- Bohr, Niels. (1937) 1972. "Biologie et physique atomique." In *Physique atomique et connaissance humaine*. Paris: Gauthier-Villars.
- Committeri, Giorgia and Chiara Fini. 2016. "Body presence and extrapersonal space perception." In *Theatre and Cognitive Neuroscience*, edited by Clelia Falletti, Gabriele Sofia and Victor Jacono, pp. 23–34. London: Bloomsbury Methuen Drama.
- Costantini, Marcello, Giorgia Committeri and Corrado Sinigaglia. 2011. "Ready both to your and to my hands: Mapping the action space of others." *PLoS One* 6: e17923.
- De Marinis, Marco. 2016. "Body and corporeity in the theatre: From semiotic to neuroscience. A small multidisciplinary glossary." In *Theatre and Cognitive Neuroscience*, edited by Clelia Falletti, Gabriele Sofia and Victor Jacono, pp. 61–74. London: Bloomsbury Methuen Drama.
- Fini, Chiara, Marcel Brass, and Giorgia Committeri. 2015. "Social scaling of extrapersonal space: Target objects are judged as closer when the reference frame is a human agent with available movement potentialities." *Cognition* 134: 50–56.
- Grotowski, Jerzy. 1968. *Towards a Poor Theatre*. Holstebro: Odin Teatrets Forlag.
- Husserl, Edmund. (1929–1935) 1973. *Zur Phänomenologie der Intersubjektivität*. The Hague: Martinus Nijhoff.
- Jacono, Victor. 2009. "La scienza dell'attore nel teatro della complessità." In *Dialoghi tra teatro e neuroscienze*, edited by Gabriele Sofia, pp. 142–153. Roma: Edizioni Alegre.
- Jacono, Victor. 2012. "Questioning how knowledge acts the relationship between the performer's pedagogy and cognitive neuroscience." PhD diss. Sapienza University of Rome.
- Jacono, Victor. 2014. "Letter for an exchange between scientists of cognition." *Brazilian Journal on Presence Studies* 4(2): 205–222.

- Jacono, Victor. 2016. "Complexity, cognition and the actor's pedagogy." In *Theatre and Cognitive Neuroscience*, edited by Clelia Falletti, Gabriele Sofia and Victor Jacono, pp. 103–116. London: Bloomsbury Methuen Drama.
- Leão, Maria. 2002. "Le prémouvement anticipatoire, la présence scénique et l'action organique du performeur: méthodes d'entraînement à travers la méthode Danis Bois." PhD diss. Université Paris VIII.
- Lippi, Daria, Corinne Jola, Victor Jacono, and Gabriele Sofia. 2016. "Step towards the art of placing science in the acting practice. A performance-neuroscience perspective." In *Aesthetics and Neuroscience. Scientific and Artistic Perspective*, edited by Zoi Kapoula and Marine Vernet, pp. 141–164. Springer International Publishing.
- Maturana, Humberto and Francisco Varela. 1973. *De Maquinas y Seres Vivos. Una caracterizacion de la organizacion biologica*. Editorial Universitaria. Santiago [Eng. tr. 1980. *Autopoiesis and Cognition: The Realization of the Living*. Boston, MA: Riedel Publishing Co.]
- Maturana, Humberto and Francisco Varela. 1984. *El Arbol del Conocimiento: Las Bases Biologicas del Conocer Humano*. Editorial Universitaria, Santiago: La Edicion [Eng. tr. 1998. *The Tree of Knowledge: The Biological Roots of Human Understanding*. Boston, MA and London: Shambala].
- Maturana, Humberto and Susana Bloch. 1996. *Biologia del emocionar y Alba Emoting. Bailando juntos*. Santiago del Chile: Dolmen.
- Morin, Edgar. 2002. "Le complexus, ce qui est tissé ensemble." In *La Complexité, vertiges et promesses. 18 histoires de sciences*, edited by Réda Benkirane. Paris: Le Pommier.
- Pradier, Jean-Marie. 2013. "Grotowski et les Sciences." In *L'Anthropologie Théâtrale selon Jerzy Grotowski*, edited by Jarosław Fret and Michel Masłowski, pp. 163–180. Paris: Édition de l'Amandier.
- Rizzolatti, Giacomo and Corrado Sinigaglia. 2006. *So quel che fai. Il cervello che agisce e i neuroni specchio*. Milano: Raffaello Cortina Editore [En. Tr. 2008. *Mirrors in the brain. How our minds share action and emotions*. Oxford University Press].
- Sofia, Gabriele. 2013a. "Achieved spontaneity and spectator's performative experience. The motor dimension of the actor-spectator relationship." In *Moving Imagination: Explorations of Gesture and Inner Movement*, edited by Helena De Preester, pp. 69–86. Amsterdam and Philadelphia, PA: John Benjamins Publishing Company.
- Sofia, Gabriele. 2013b. *Le acrobazie dello spettatore. Dal teatro alle neuroscienze e ritorno*. Roma: Bulzoni Editore.
- Sofia, Gabriele. 2013c. "The effect of theatre training on cognitive functions." In *Affective Performance and Cognitive Science*, edited by Nicola Shaughnessy, pp. 171–182. London: Methuen Drama.
- Sofia, Gabriele. 2016. "Towards an embodied teatrology?" In *Theatre and Cognitive Neuroscience*, edited by Clelia Falletti, Gabriele Sofia and Victor Jacono, pp. 40–60. London: Bloomsbury Methuen Drama.
- Varela, Francisco. 1989. *Connaître. Les sciences cognitives, tendances et perspectives*. Paris: Édition du Seuil.
- Varela, Francisco. 1996. "Neurophenomenology: A methodological remedy to the hard problem." *Journal of Consciousness Studies* 3: 330–50.
- Varela, Francisco, Humberto Maturana, and Ricardo Uribe. 1974. "Autopoiesis: The organization of living system, its characterization and a model." *Biosystems* 5: 187–96.
- Varela, Francisco, Evan Thompson, and Eleanor Rosch. 1991. *The Embodied Mind. Cognitive Science and Human Experience*. Cambridge and London: The MIT press.
- Von Bertalanffy, Ludvig. 1972. "The history and status of general systems theory" *The Academy of Management Journal* 15(4) : 407–26.

Translation Gennaro Lauro