

(Refuting) Arguments for the End of Theatre: Possible Implications of Cognitive Neuroscience for Performance

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Theatre and research models generally follow paradigms of science and culture, and a number of scholars have considered how scientific and technological shifts have affected our understanding of theatre and performance. For example, Philip Auslander addresses the impact of electronic media on our understanding of liveness and authenticity in *Liveness*,¹ and Jon McKenzie examines the impact of new technologies in a range of fields in *Perform or Else*.² Most pertinent to my project is Joseph Roach's excellent and invaluable *The Player's Passion: Studies in the Science of Acting*,³ which traces the effect of changing scientific paradigms on how we have understood the actor's process, taking us through mechanist, vitalist, biological, and psychological perspectives ranging from the behavioral to the psychoanalytic, each of which held currency in its own time, but which was superseded by the next wave of research. Interestingly, by the time Roach's work was published, first in 1985 and then in 1993, research was underway in the cognitive and neurosciences that was calling into question basic aspects of consciousness, cognition, and brain function that is again redefining our sense of the actor's process. My particular interest is in the cognitive neurosciences, which look at the biological ground and processes of cognition and behavior; discoveries in these fields are raising questions about basic elements of the theatrical event, among them the nature of the actor's process in relation to feeling, memory, imagination, action, and partnered work, and the nature of the relationship between performer and audience.

I begin experientially and anecdotally. I want to tell a story. I want to speak about failure. At the International Federation for Theatre Research conference in summer 2006 in Helsinki, I gave a seminar paper on how cognitive neuroscience might let us rethink the conference theme about the nature of the relationship between the global and the local in regard to performance. A major problem with the paper was that I tried to cover too much in twenty minutes; I tried to be too global. But another major problem had to do with being misheard (if I want to place

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responsibility on others) or with not being clear (if I take responsibility myself); I think both were factors. While there were positive responses in the discussion period, there were some stark negatives. Following a few tame questions, a woman in the audience began by saying, “I have no use for the neuroscience,” and asked a question of another panelist. Shortly thereafter the woman sitting beside her said, “I too have no use for the neuroscience,” and asked a question of the other panelist. Then one my fellow panelists began a response to another question, having nothing to do with my paper, with “And I have to say I too have no use for biological determinism.” And then my other fellow panelist, in talking about what he was trying to theorize, said, “My work is about the self and other as a dynamic, while yours seems to present the self as a unitary, isolated, stable entity.” When we talked later at a reception, he said, “I use the continental theorists, Lacan, Derrida; unlike you, I don’t like the Anglophones, Locke, Hume, you know . . .”

I felt a bit like Alice through the looking glass. I wanted to ask the two women, since they had no use for neuroscience and, I’m assuming, cognitive neuroscience, which was what I was drawing on, whether they had some use for a brain—and, more importantly, what they hoped to accomplish by closing the door to discussion. And I wanted to ask my first colleague if he thought he’d actually heard the words “biological determinism” coming out of my mouth, much less in a positive way, and my other colleague if he’d been listening when I was talking about the contingency of biology and how the biological ground of the self is shaped powerfully by our encounters with the environment, which includes culture and each other, and if he truly thought he’d heard me talk about eighteenth century English philosophers (I hadn’t, though it could be interesting to think about the historical trajectory of these issues in regard to consciousness studies, which is not what I’d been discussing).

Besides my failure to be articulate, I think underlying these encounters were a number of anxieties, possibly including a particular kind of anti-science bias that feminist cognitive neuroscientist Elizabeth Wilson calls the “anti-essentialist essentialism” of some post-modern theories that reject science because it must de facto be insufficiently socially theorized and uncritically dependent on uncontextualized material observation—a reverse of some scientists’ critiques of other disciplines that concentrate on the theoretical or abstract in contradiction to material evidence.⁴ There are anxieties about loss of authority, loss of status, insecurities about realizing that we don’t know what we thought we knew, concerns that our interpretations of given events or situations might need to be rethought, sometimes radically, based on new information. Perhaps a major anxiety has to do with the challenges that brain and cognitive sciences present to definitions of identity and self, based on the gross misunderstanding that the science is inevitably leading us to an increasingly hypermaterialistic, overdetermined definition of the human, i.e., there will eventually be not only an explanation, but a formula, to explain and ultimately control our every feeling, thought, and action, taking away

our individuality and freedom, because we are no more than physiological and electrochemical processes. The fear is that the science will take away the part of us that has choice, that makes art, that makes democracy possible. This is possibly the point at which anxieties about the end of theatre—and maybe even humanity, for want of a better way of putting it—arise. Interestingly, the science, through discovering more about material functions that support consciousness, increasingly confirms the complexity and *contingency* of emotional, cognitive, and behavioral processes, which can vary considerably based upon the specific individual and her situation. I repeat: the science, through discovering more about material functions that support consciousness, increasingly confirms the complexity and *contingency* of those processes. The science is not taking away “the human” and, hence, theatre and performance; rather, it is providing tools to engage these more closely. Also, scientists disagree about their work at least as intensely as we do about ours; as in our fields, there is research, there is argument, there is more research, there is more argument, and things change. I could also argue that the speed of substantial change in the cognitive neurosciences easily outpaces that in our fields, which makes it challenging for individuals within those disciplines to stay current, and even more challenging for those of us using the findings of those disciplines. Both science and performance theory can be abused, e.g., by politicians who distort the findings of scientific research for political ends or who use the tools of rhetoric and performance to manipulate the citizenry, but this denies neither the uses of science and performance theory, nor the fact that performance and scientific memes, paradigms, and hard and soft knowledge inform, frame, and sometimes limit how we think.

Now, some science. I want to focus on a narrow aspect of research into neural systems related to mirroring and simulation. This research has implications for theatre and performance particularly in terms of understanding imitation, empathy, intention, and the connections not just within, but among, our brains. Though scientists disagree about the precise nature of some of the processes I will describe, there is agreement that our brains are connected by neural mirroring functions in ways that significantly affect learning and social relations, and hence art. I make no pretense of being an expert in scientific matters; my goal is to use science better to understand what happens in the studio or in performance.

In 1996 Iacomo Rizzolatti and his colleagues at the University of Parma published their findings that monkeys’ brains contain a special class of neurons

that respond to a particular kind of gesture, no matter who is making the gesture—the monkey whose brain activity is being recorded, or another monkey. If the monkey being recorded reaches for a grape, areas in the animal’s prefrontal lobes discharge. If another monkey, or even a human, reaches for

the grape, the neurons of the monkey observing the action also discharge. In short, the neurons mirror both activities of the self and activities of others directed at the same goal.⁵

From the perspective of mirror neurons, or “monkey see, monkey do” neurons, watching something is the same as doing something—the same neuron fires. Rizzolatti and others have gone on to discover that human brains have a number of mirror neuron systems and also simulation neuron systems that allow us to understand “not just the actions of others, but their intentions, the social meaning of their behavior and their emotions.”⁶ This does not mean that the brains of the one who acts and the one who observes are identical in all respects in the moment of action, but rather that particular mirroring and simulation systems are identical; there are whole other sets of neurons that fire in the brain of the one who is acting, which differentiate the actor from the observer. (There is disagreement about the precise function of motor mirror neurons in relationship to non-motor functions such as empathy and “reading” intentionality, but this is spurring intensive research into these and other kinds of neurons engaged in simulation that seem to let us connect to other people.) As Rizzolatti argues, “Mirror neurons allow us to grasp the minds of others not through conceptual reasoning but through direct simulation. By feeling, not by thinking.”⁷ The bottom line is that these neural systems connect us to each other in concrete ways that were previously unknown. Some scientists now posit that mirror neurons make imitation, and hence language and culture, possible; these would not exist without mirror neurons. We learn by looking and copying, e.g., an infant will copy a parent sticking out a tongue or making noises as she develops. These discoveries have specific implications for actors, for whom mirroring may be at the center of creativity, and for audiences, if we understand that their brains are lighting up identically to ours in some regards as we are onstage.

This research provides a new prism through which to view past thinking about theatre and performance. The nature of the arguments between Plato and Aristotle regarding the power of imitation and of watching gain fresh urgency, in terms of both Plato’s warnings about “imbibing the reality” of things imitated and the power of watching and Aristotle’s championing of imitation as natural, pleasurable, and necessary to learning. Mirror neuron research actually provides support for both, acknowledging that, in at least one particular way, we are neurologically bound to embody what we watch. These neural systems are another facet of the organic ground of mimesis, providing another way to understand the power of imitation, empathy, and identification. This research provides ground for a new iteration of inquiry regarding the power and effect of imitation, particularly related to neural patterning and reinforcement. However, it would be wrong to use this research moralistically (Platonically?), because of the complexity of the processes and the contingency of the interactions between individual and environment. Rather than

pushing us closer to the end of theatre, we are being challenged to understand that the sources of its power are embedded and embodied in us perhaps more deeply than we have ever imagined, and that fundamental questions raised by the two first theorists of western theatre remain incompletely answered. Moving closer in time to ourselves, Diderot's discussion of the superiority of the actor without feeling requires reconsideration, for it now seems that aspects of empathy and simulation are fundamental in neural mirroring, and that aspects of imitation are inseparable from feeling. There is further evidence for abandoning the polar positions taken by Dumesnil and Clairon ("Feeling" vs. "Reason") and the tired acting binary of "inside-out" vs. "outside-in," of the inwardly/privately psychological vs. the observational/externally technical. Neural and cognitive functioning is fundamentally relational, about our relationship with the environment, with each other. Can we still say there is a hard and fast line between our self and another, if my mind is activated identically to yours in some respects when you move your hand to reach for something? What in fact are the boundaries between your feelings and mine, your actions and mine?

In terms of immediate practical applications for the actor, use of research on the neural level is limited; we cannot work with an actor neurally—yet. But it does open up new ways of thinking about old issues. Rizzolatti and others assert neural mechanisms, including mirror neurons, "allow us to directly understand the meaning of the actions and emotions of others [we are observing] by internally replicating ('simulating') them without any explicit reflective mediation," i.e., conscious thought is not involved.⁸ These simulation mechanisms allow us to "link 'I do and I feel' with 'he does and he feels'" directly and provide the basis for us to be able to function socially, i.e., in relationship to others. Through neural mirroring, "part of our mirror system becomes active 'as if' we were executing that very same action that we are observing."⁹ This directly echoes Stanislavsky's "if" for the actor, even though we are not physically active, and could conceivably be used as yet one more argument for challenging the actor to expand her experience—in life, in terms of taking in as much as possible in engaging others, and in art, in terms of seeing as many superb and innovative performances as possible, i.e., activating the simulation and mirroring systems.

Among other things, some neural mirroring systems also allow us to understand the intentions of the person we are observing, i.e., we experience not just what they are doing, but to some degree what they want, "the 'why' of an action"¹⁰—what actors call motive. Scientists disagree about how involved the motor mirror neuron system is in social cognition (see particularly Jacob and Jeannerod, "Motor Theory," and Csibra, "Mirror Neurons"),¹¹ i.e., how accurate it is to nickname mirror neurons proper "empathy neurons" or "Dalai Lama neurons," as some have. For example, while Rizzolatti, et al., argue that a mirroring mechanism "is also involved in our capacity to *understand* and *experience* the emotional states of

others,” as demonstrated in their research on the neural effects of observing facial expressions of disgust,¹² Alvin Goldman hypothesizes that there are three kinds of mechanism that support mirroring and simulation: motor mirroring mechanisms, general mirroring mechanisms, and simulation mechanisms that work partly at the conscious level¹³; these latter provide linkages among pre- and conscious levels, which make them, Goldman argues, “more promising as a unifying basis of social cognition.” Regardless, we do know that much of this—whether categorized as mirroring or simulation—happens automatically, i.e., pre-consciously.

This work is connected to research on other psychophysical phenomena, such as Paul Ekman’s on the relationship between facial expressions and feeling,¹⁴ Susana Bloch’s on the relationship between posture, breathing patterns, and emotion, through her Alba emoting technique for actors,¹⁵ and Antonio Damasio’s on, among other things, “as-if” body states and emotion, in which imagining a situation causes the body to replicate the physiology of being in the actual situation.¹⁶ However, research on mirroring and simulation goes a step further. In defining brain structures “that are active both during [sic] the first- and third-person experience of actions and emotions,” i.e., “I do/feel” and “he does/feels,” a fundamental *physical*, not just “psychological” “bridge is created between others and ourselves.”¹⁷ What it posits is an “unmediated resonance,” “a shared direct experiential understanding” between individuals: “By means of a shared neural state realized in two different bodies that nevertheless obey to the same morpho-functional rules, the ‘objectual other’ becomes ‘another self’” (Gallese, “Intentional Attunement”).¹⁸ These could be called definitions of empathy, and they begin to allow us to understand some of the different mechanisms by which we identify with and connect to “others.” Indeed, research has shown that the absence or defective functioning of mirror neurons is characteristic of autistic individuals, who cannot connect socially or empathetically. Scientists are also studying prediction and what they call “mind-reading” (i.e., reading the state or intention of another person) in regard to mirroring and simulation systems. Gergely Csibra hypothesizes that mirror neurons are “involved in the prediction or anticipation of subsequent—rather than in the simulation of concurrent—actions of the observed individual,”¹⁹ possibly making them more accurately named “predictor” neurons. These functions likely underpin some of the most basic acting exercises such as the mirror exercise we all do in our beginning acting classes and Meisner’s repetition exercise and could, for example, provide new ways of thinking about the problem of an actor’s anticipation.

Developments occur almost daily that have profound effects on how we understand ourselves. We are connected in ways we cannot yet conceive that allow us to imitate each other, empathize with each other, speak with each other, and make performances with each other—because our brains are literally firing each other up in ways that mirror each other. So what really then is the nature of the boundary between ourselves and others, between experience and imagination, between action

and emotion, when observing the actions of another person lights up the same set of neurons in our head as the one doing the acting?

We must be open to the use of science in regard to art in this time when science and its rigorous application are being resisted politically and culturally by too many in the United States. We are duty bound to see and embrace those things that constitute nature as fully and honestly as possible. We could do worse than to take our cue from Shakespeare:

Be not too tame neither, but let your own discretion be your tutor: suit the action to the word, the word to the action; with this special observance, that you o'erstep not the modesty of nature; for anything so overdone is from the purpose of playing, whose end, both at the first and now, was and is, to hold, as 'twere, the mirror up to nature; to show virtue her own feature, scorn her own image, and the very age and body of the time his form and pressure.²⁰

Part of this nature is that we are biological creatures with consciousness. We are constrained by organic processes that unfold in a particular range of ways, and we are guided by cultural processes that interact contingently to direct and shape those biological processes. Part of the form and pressure of our time is the ever-changing impact of science on our lives. As the science increasingly and inevitably lets us shape and control the biological, we may have to give up parts of comfortable definitions of what it means to be an actor or an audience member, or what a feeling or a memory or a thought or an action is, or even what theatre is. We need to reconceive, if only in some small degree for now, our definitions of the relationship between “you” and “me.” We need to reconceive difference. My hope is this will free us to be more sensitive and nuanced in the way that we understand the actor and the audience, and feeling, memory, and action, and in the way that we make and think about theatre.

Notes

1. Philip Auslander, *Liveness: Performance in a Mediatized Culture* (New York: Routledge, 1999).
2. Jon McKenzie, *Perform or Else: From Discipline to Performance* (New York: Routledge, 2001).
3. Joseph Roach, *The Player's Passion: Studies in the Science of Acting* (Ann Arbor: U of Michigan P, 1993).
4. Elizabeth Wilson, *Neural Geographies: Feminism and the Microstructure of Cognition* (New York: Routledge, 1998) 15-18.
5. Michael S. Gazzaniga, *The Ethical Brain* (New York: Dana Press, 2005) 104.
6. Sandra Blakeslee, “Cells That Read Minds,” *New York Times*, Jan. 10, 2006 <<http://www.nytimes.com/2006/01/10/science/10mirr.html?ex=1170651600&en=1679dfb11fa5b3b7&ei=5070>>.

Accessed February 3, 2007.

7. Blakeslee, "Cells That Read Minds."

8. Vittorio Gallese, Christian Keysers, and Giacomo Rizzolatti, "A unifying view of the basis of social cognition," *Trends in Cognitive Sciences* 8 (Sept. 2004): 396.

9. Gallese, Keysers, and Rizzolatti, "A unifying view" 397.

10. Marco Iacoboni, Istvan Molnar-Szakacs, Vittorio Gallese, Giovanni Buccino, John C. Mazziotta, "Grasping the Intentions of Others with One's Own Mirror Neuron System," *PLOS Biology* 3 (March 2005): 529.

11. Pierre Jacob and Marc Jeannerod, "The Motor Theory of Social Cognition. A Critique," *Interdisciplines: What Do Mirror Neurons Mean?: Mirror Systems, Social Understanding and Social Cognition* <<http://www.interdisciplines.org/mirror/papers/2>>. Accessed February 3, 2007.

12. Gallese, Keysers, and Rizzolatti, "A unifying view" 397.

13. Alvin Goldman, "Mirror Systems, Social Understanding and Social Cognition," *Interdisciplines: What Do Mirror Neurons Mean?: Mirror Systems, Social Understanding and Social Cognition* <<http://www.interdisciplines.org/mirror/papers/3>>. Accessed February 3, 2007.

14. See, for example, Paul Ekman, *Emotions Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life* (New York: Times Books, 2003) and Paul Ekman, et al., eds., *Emotions Inside Out: 130 Years after Darwin's The Expression of Emotions in Man and Animals* (New York: New York Academy of Sciences, 2003).

15. See, for example, www.albaemotingha.org.

16. See, for example, Antonio Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (New York: Harcourt Brace & Co., 1999).

17. Gallese, Keysers, and Rizzolatti, "A unifying view" 400.

18. Vittorio Gallese, "Intentional Attunement. The Mirror Neuron system and its role in interpersonal relations," *Interdisciplines: What Do Mirror Neurons Mean?: Mirror Systems, Social Understanding and Social Cognition* <<http://www.interdisciplines.org/mirror/papers/1>>. Accessed February 3, 2007.

19. Gergely Csibra, "Mirror neurons and action observation. Is simulation involved?," *Interdisciplines: What Do Mirror Neurons Mean?: Mirror Systems, Social Understanding and Social Cognition* <<http://www.interdisciplines.org/mirror/papers/4>>. Accessed February 3, 2007.

20. William Shakespeare, *Hamlet* III.ii.

SUPPLEMENT

**A Space Shaped by Absence:
“Performative Drift, Women, Girls and Feminist Embodiment”**

